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REPORT

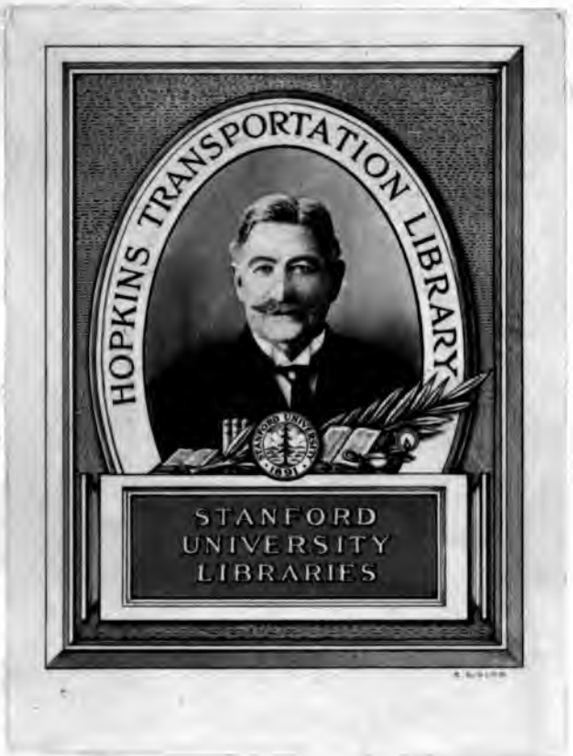
OF THE

CRUISE OF THE REVENUE STEAMER

CORWIN

IN THE ARCTIC OCEAN

1885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LETTER

FROM

THE ACTING SECRETARY OF THE TREASURY,

IN RESPONSE TO A RESOLUTION BY THE HOUSE,

TRANSMITTING,

With accompanying documents, the report of Capt. M. A. Healy, U. S. Revenue Marine, upon the cruise of the Revenue Marine steamer Corwin in the Arctic Ocean, in the year 1885.

MARCH 30, 1886.—Referred to the Committee on Naval Affairs and ordered to be printed.

TREASURY DEPARTMENT, *March* 29, 1886.

Sir: In response to the resolution of the House of Representatives of the 18th instant, I have the honor to transmit herewith a copy of the report of Capt. M. A. Healy, U. S. Revenue Marine, upon the cruise of the Revenue Marine steamer *Corwin* in the Arctic Ocean, made in the year 1885, and its accompanying documents and illustrations.

The following is a list of the inclosures which constitute the report and its accompaniments:

(1) General report of operations of vessel for the protection of the seal fisheries and sea otter hunting-grounds.

(2) Report of Lieut. J. C. Cantwell, of exploration of the Kowak River, with photographs and book of sketches.

(3) Notes on birds of Kowak River and other portions of Alaska, and notes on fishes of Alaska, by Charles H. Townsend, assistant, U. S. Fish Commission.

(4) Report of Assistant Engineer S. B. McLenegan, of exploration of the Noätak River.

Number of photographs, 56.

I have respectfully to request that in printing the above-mentioned report provision be made by Congress to furnish to the Treasury Department three thousand (3,000) copies.

Very respectfully,

C. S. FAIRCHILD,
Acting Secretary.

Hon. J. G. CARLISLE,
Speaker House of Representatives, Washington, D. C.

U. S. REVENUE CUTTER "CORWIN." DEPARTURE FOR ALASKA.

OUNALASKA.

REPORT

OF THE

CRUISE OF THE STEAMER CORWIN.

U. S. REVENUE MARINE STEAMER CORWIN,
San Francisco, Cal.

SIR: I have the honor to submit the following report of the Alaskan and Arctic cruise of the U. S. Revenue Marine steamer *Corwin*, under my command, during the summer of 1885.

The *Corwin* left San Francisco, Cal., on the afternoon of April 29, and arrived at Ounalaska May 9, having made the passage in ten and one-quarter days.

The voyage, aside from the rough weather usually experienced on a trip of this kind, was devoid of any incident worthy of particular mention until the last day. About 2 o'clock in the morning of the 9th of May, Francis McCauley, the seaman on lookout, was suddenly thrown overboard by the motion of the vessel, which was rolling deep in the trough of the sea. The engine was immediately stopped and reversed, a life-buoy thrown overboard, and two boats promptly lowered to rescue him, but all without avail. We remained in the vicinity of the accident, our boats pulling to and fro, for four and one-half hours, and then steamed ahead for Ounalaska, where we arrived at 9 o'clock that evening. The deceased bore a most excellent reputation, and his tragic and sad death cast a gloom over our ship for many days.

A few days after our arrival at Ounalaska, the bark *Atlantic* was sighted outside, endeavoring to enter the harbor. There being no pilots in the vicinity, and knowing that the captain was unacquainted with those waters, I went to his assistance and piloted the *Atlantic* into Ounalaska Harbor. She had been injured by the ice and was then leaking badly, and was obliged to enter port to make repairs. While in port we lent every aid to expedite the work of repairing, and members of our crew assisted in blacksmithing and carpentry.

At Ounalaska we took on board a supply of coal and water, and left on the morning of the 14th of May, intending to visit the island of Attou, the westernmost of the Aleutian group, and on our return to stop at the settlements between Attou and Ounalaska.

When we were off Cape Cheerful it was found that the engine worked very badly. The vessel was put under sail and the engine stopped and uncoupled, and a preliminary examination disclosed a crack in the crank-pin, compelling us to work back to Ounalaska under sail. After arriving in port, a careful and thorough examination was made by the chief engineer, who reported the crank-pin broken in a dangerous manner, and that it would be necessary to have it repaired before continuing our cruise north. After much reflection and with a great deal of regret, we started back to San Francisco to make repairs, leaving Lieutenant Cantwell and two seamen at Ounalaska with instructions to take passage on the steamer *St. Paul* to Otter Island, there to protect seal life during the absence of the vessel.

We arrived in San Francisco May 28, and on the following day, acting under telegraphic instructions from the Department, I awarded the contract for repairs to the Risdon Iron Works of San Francisco, the work to be completed in not more than eight days. The company's employés labored night and day, and finished the work in one week, in such a workmanlike manner that it has given entire satisfaction since.

The repairs having been completed on the 4th of June, we left San Francisco at 10 o'clock that evening, and again started for the Aleutian Islands.

We arrived at Ounalaska June 17, coaled and watered ship, and received on board one bidarka (skin boat) for the use of the expedition up the Noätak River.

The volcano of Bogosloff was visited June 19. The general appearance of the volcano is not changed from that of a year ago, but its activity is somewhat lessened. The height of the lower peak of New Bogosloff was ascertained to be four hundred and fifty feet above the sea-level, and that of the higher peak estimated about seventy-five feet more, both peaks being inaccessible on account of the steam and the fumes of sulphurous oxide in which they are enveloped.

Cruising northward from Bogosloff, we touched at St. George's and St. Paul's Islands on June 20, and at the latter place Second Lieutenant Benham was detailed for duty on Otter Island to relieve Third Lieutenant Cantwell.

Mr. C. H. Townsend, naturalist of the Smithsonian Institution, who was at St. Paul's Island, requested that he be taken on board the *Corwin* for passage to the Arctic, to enable him to make ichthyological and ornithological collections in that country. As that part of the country was an entirely new field for a naturalist, and believing that Mr. Townsend's labors would be of great value to science and of much interest to the public, I received him on board to accompany Lieutenant Cantwell on his expedition up the Kowak River.

We consulted with the Government agents on the islands and learned that no marauding vessels had been seen in the vicinity up to that time. They also stated that the seals had commenced to haul up on the islands, without any perceptible diminution from previous years.

We remained in the vicinity of the seal islands for several days; then continued our cruise to the northward and eastward, touching at St. Michael's and Golwin Bay.

At St. Michael's we took on board an Indian interpreter to accompany Lieutenant Cantwell's expedition. Nothing had transpired at St. Michael's since last year which would require our interference. The health of the white people was excellent, and the Indians were peaceable and friendly.

At Golwin Bay First Lieutenant Hall and Surgeon Yemans were dispatched to visit the mining camp to ascertain the condition of the white men and Indians there, and to render medical aid if such was required. Lieutenant Hall found but one man at the mine, Mr. Mackey, who had remained there all winter in order to make good the claim of the Golwin Bay Mining Company. Mr. Mackey visited the vessel, and reported that the natives were peaceful and that he had experienced no difficulty in getting along with them. He also reported the mines as very rich, with an inexhaustible quantity of ore. The specimens which have been assayed prove very rich, but the result cannot as yet be foreseen. The company have been to considerable expense in working the mine, and have lost two vessels thus far. A more thoroughly organized company, consisting of fifteen miners and superintendent, with suitable supplies and equipments for one year, arrived at the mine the day of our departure, and from them better results are anticipated. The great distance of the mine from civilization is a very decided disadvantage. The mine is situated on the Fish River, about thirty miles from the mouth, and the shallowness of the water makes it a matter of no little difficulty to convey the ore from the mine to the vessel, which takes it to San Francisco for smelting.

There are those who prophesy that the Indians will eventually molest the miners in their operations. If any such difficulty does occur, it will, I think, be brought about by some overt act on their part, as the Indians are generally well-behaved and peaceable, and not unaccustomed to mingling with white men. If there is any trouble it will be caused by the introduction of liquor among the Indians or the total disregard of their personal family rights, which, in all Indian territory, the whites seem to ignore.

After leaving Golwin Bay we touched at Sledge Island and King's Island, and on June 27 anchored off our coaling station at Point Spencer.

At Point Spencer we found the bark *Wanderer* and the schooner *Page*, both whaling vessels, and also the schooner *James A. Garfield*, which brings supplies to a portion of the Arctic whaling fleet.

GROUP OF NATIVES AND UP-COUNTRY INDIANS, ST. MICHAELS.

MYUNIK (INTERPRETER).

BOGOSLOV ISLAND, NEW END, BEARING N. W. BY N.

BOGOSLOW ISLAND, OLD END, BEARING E. BY S.

BOGOSLOV ISLAND, SAIL ROCK, BEARING S. E.

BOGOSLOV ISLAND, NEW END, BEARING N. W. BY N.

The whaling vessels brought down the news of the loss of the barks *Gazelle* and *Napoleon*, both of which were crushed in the ice early in the spring, the latter losing twenty-two men.

We watered and coaled ship at Point Spencer and rendered medical assistance to those of the whaling fleet that required it.

The steam whalers *Balæna* and *Orca*, and the barks *Helen Mar*, *Jacob A. Howland*, and *Fleetwing*, arrived at Point Spencer during our stay, and were boarded and examined by us.

June 30 we left Point Spencer, touched at the Diomede Islands, and on July 1 anchored in Kotzebue Sound, off Hotham Inlet.

Although the ice was reported by the whalers early in the season as being heavy and farther south this year on the Siberian coast than has been known for many years, the *Corwin*, cruising much later along the Alaskan shore, did not encounter it until the afternoon of July 1, in latitude 66° 47′ N., or about fifteen miles north of the Arctic Circle; and then, although our progress was somewhat retarded, it did not prevent our entrance into Kotzebue Sound.

The day after our arrival in Kotzebue Sound Lieutenant Cantwell and Mr. Townsend, with the steam-launch and two men, left the vessel with supplies and outfit to continue the exploration of the Kowak River, which was begun by Lieutenant Cantwell last year.

At Sheshalik, where the natives of the coast and interior rendezvous for the purpose of trading and fishing, no Indians had at that time arrived, and considerable difficulty was experienced in obtaining a suitable boat for the use of the Kowak River expedition. One of a very inferior nature was finally procured and paid for in trade goods.

On the same day Assistant Engineer McLenegan and seaman Nelson left the vessel with the skin boat received at Ounalaska to make an exploration of the Noätak, a river which up to that time had never been ascended by a white man.

After landing these expeditions and their supplies, and seeing them properly started, we cruised along the coast to Point Hope, thence as far as latitude 69° 32′ N., longitude 174° 15′ W. There we met the ice, packed solid as far as the eye could reach from masthead, and making progress farther north impossible. On our return we fell in with a lot of walrus and two polar bears, to which the surgeon and I gave chase, but did not succeed in capturing any.

The barks *Abram Barker* and *Stamboul* were spoken, and also boarded and examined. Medical aid was rendered to an officer of the *Stamboul* who was somewhat demented, and who, a few days later, committed suicide. In this connection I may state that I have noticed that insanity is more frequent proportionally among the foremast hands of whaling-vessels than among any other class of seafaring men.

Among the rescued crews brought down at different times by the *Corwin* I have frequently observed slight symptoms of insanity, and this has also been noticed by the surgeon of this vessel when visiting vessels of the whaling fleet professionally. Whether these men are so afflicted when they ship, or whether their affliction is superinduced by the strain to which they are subjected while in the vicinity of the ice, I am unable to say, but I think the latter the more probable.

From the time of leaving the ice-pack until our return to Point Spencer, July 8, the weather was extremely foggy, making our progess very slow and requiring great precaution. On arriving at Point Spencer we found several additional vessels of the whaling fleet rendezvoused for the purpose of shipping their oil and bone and of receiving supplies from the tender that went there to meet them. Some of the whalers had also gone into Point Spencer for the purpose of making repairs, having been damaged by coming in contact with ice. The steam whaler *Balæna* had injured her stern and bows, the steamer *Thrasher* had her propeller bent, and the bark *Arnolda* was partially stove forward. The vessels were damaged by ice on the Siberian coast early in the season, and all succeeded in making temporary repairs while at Point Spencer.

The schooner *James A. Garfield* left for San Francisco on the morning of July 11, taking the mail and a part of the catch of the Pacific steam whaling fleet.

After coaling and watering at Point Spencer, we left there at 4 o'clock in the morning of July 13, and soon after met the whaling bark *Dawn*, trying to make a harbor. From the captain of the *Dawn* I learned that his vessel was very badly injured by the ice, and upon his request for assistance we took the *Dawn* in tow for Grantley Harbor.

The entrance to Grantley Harbor being very narrow, considerable difficulty was found in entering, there being two shoal places on either side of the channel, with not more than two and a quarter fathoms of water. The bark grounded at 10.30 in the morning, and it was not until 4 o'clock in the afternoon, when the tide rose, that we succeeded in hauling her afloat. In the mean time two of our boats, in charge of officers, had sounded out the remainder of the channel and located temporary buoys, thus enabling us to tow the bark into the harbor without further detention.

We remained in Grantley Harbor the next thirty-six hours, during which time the officers and crew sounded out the entire channel and placed range beacons along the shore to mark the entrance to the harbor. Although the harbor is entirely land-locked, the shallowness of the water at its entrance makes it unserviceable for vessels of any draught.

We left Grantley Harbor July 15, having first sent one of our crew on board the *Dawn* to assist in necessary blacksmith work, and leaving with him a tent and supplies, with instructions to await our return on shore in case of the departure of the *Dawn* before our arrival.

We touched at King's Island, Cape Prince of Wales, and East Cape, then cruised to the southward along the Siberian coast and entered St. Lawrence and Mechigme Bays. Thence we steamed through Seniavine Straits to and around St. Lawrence Island and back to Point Spencer, where we arrived on the 26th of July.

During our absence we made several explorations, the result of which will, I think, be of much value to Arctic navigation.

As the whaling fleet operates along the Siberian coast during a considerable part of the whaling season, it is necessary that they should have some near harbor to enter for repairs when injured by the ice. No such harbor was positively known to them, but they had heard that there was a harbor off the village of Whalen, on the north side of East Cape.

When at East Cape I sent an officer to make a reconnaissance of the supposed harbor, with a view to establish a refuge for the fleet. At the entrance of what proved to be a lagoon about eight miles long but ten feet of water was found, and that was the greatest depth obtained inside, while that part of the lagoon extending east from the entrance was almost entirely filled with shoals. The shallowness of the water at the entrance of this lagoon precludes its use as a harbor.

At Mechigme Bay, however, about eighty miles down the coast, an entirely different and most satisfactory result was obtained. At the entrance to the bay fourteen fathoms of water was found, and on the inside five fathoms can be carried for several miles. This harbor, being entirely landlocked, affords protection from the wind from any direction, and is, in my opinion, the best harbor north of the Aleutian Islands.

When steaming through Seniavine Straits a reef was discovered between Nouneangane and Ittygrave Islands, extending in a northeast and southwest direction, a very dangerous obstruction to navigation, not being laid down on the chart. An officer of the vessel in sounding found the reef very rocky with but two and a half fathoms of water over it.

The result of our labors in Mechigme Bay and Seniavine Straits, with the soundings obtained by us along the Siberian and Alaskan coasts, will be given to the Hydrographic Office in this city.

On the 27th of July the *Dawn*, having completed repairs, left Point Spencer to return to the whaling-grounds. Three of her crew had deserted, and the captain requested the cutter to pick them up and return them to their vessel. Accordingly, the day after the departure of the *Dawn*, the men were taken on board and kept until we should again meet that vessel. The men claimed that the *Dawn* was unseaworthy, and stated that on that account they had deserted, as they did not consider it safe to remain in her. They were turned to with our own crew, and a Government ration served to them while they remained on board.

Owing to a strong northerly gale we were compelled to remain one week at Point Spencer before we could coal and water ship. We left Point Spencer August 2, touched at Cape Prince of Wales and the Diomede Islands, and on the following day anchored off Hotham Inlet, Kotzebue Sound. Here we landed supplies for the use of the two expeditions on their return from the Kowak and Noätak Rivers.

VIEW OF LAKE AND MOUNTAINS, HEAD OF GRANTLEY RIVER.

FAIRWAY ROCK, BEHRING STRAIT, N. BY E.

DRYING FISH AT GRANTLEY HARBOR.

VIEW OF LAKE AND MOUNTAINS, HEAD OF GRANTLEY RIVER.

From Kotzebue Sound we cruised along the coast to the northward and touched at Point Hope, watered ship at Cape Lewis, and anchored off Cape Lisburne coaling station. This station we supplied with a small quantity of medicines and a few other necessary articles, then resumed our cruising to the northward along the coast. At 3 o'clock in the afternoon of August 9, when about fifteen miles north of Icy Cape, we encountered heavy drift-ice, but succeeded in working our way through it, and at 7.45 that evening came to anchor off Point Marsh, amongst the whaling fleet of about thirty vessels.

The captain of the first vessel spoken reported that some of the fleet were in the ice-pack and could not get out. After cruising amongst the fleet I found that the report was without foundation, all of the vessels being out of danger. Some of them, however, were compelled to shift anchor occasionally to avoid the heavy ice, which was then drifting to the northward about one and one-half miles per hour.

The following day, August 10, was the most eventful of the season, and will long be remembered by the whaling fleet and the crew of the *Corwin* as a day of calamities. The day commenced bright and clear, with a light to gentle breeze blowing from the east. About 11 o'clock in the morning the weather was very squally, the wind hauling gradually to the southward and increasing in force every moment.

At noon a boat belonging to the bark *Abram Barker*, having brought mail on board the *Corwin*, started to return to the bark. She had proceeded but a short distance when she was suddenly capsized by a heavy squall, and the occupants, consisting of the second mate and five men, were left struggling in the water. The accident being observed on board this vessel, the surf-boat was promptly lowered, and, in charge of Third Lieutenant Kennedy, went to the rescue. The men were all hauled in the boat and after much hard pulling against the wind and sea were safely landed on board the bark *Helen Mar*, that being the nearest vessel to the scene of the accident, and on board of which the doctor was then officially visiting.

The wind continued to increase, and by 2 o'clock in the afternoon had developed into a strong SSW. gale. The majority of the whaling fleet were now under way, working under short sail. Some of them parted and others slipped their cables, not being able to heave them in on account of the very rough sea and strong tide.

At 3 o'clock the bark *George and Susan*, which was at anchor, parted one of her cables and began to drag. Sail was put on her and every effort made to get her out of danger, but before she could be got under way she dragged afoul of the bark *Mabel*, which was at anchor near by, carrying away the jibboom and all the head gear of the *George and Susan*, and breaking the *Mabel's* mainyard.

The *George and Susan* then went ashore, striking very hard on the beach, and in less than three hours had seven feet of water in her hold. When she struck, some of her crew, in their excitement, cleared away two boats, jumped into them, and headed for the shore.

A very heavy surf was running on the beach, which swamped both boats and drowned three of their crew. The remainder succeeded in landing on shore in an exhausted and semi-conscious state; in fact, some of them were in an exceedingly critical condition for several hours after landing.

At 3.45 we got under way and steamed down toward the *George and Susan* to see if we could render any assistance to her or any other vessel of the fleet. Observing that the *Mabel* was in what I considered an extremely dangerous position, we entered the breakers and anchored near her in four and a quarter fathoms of water with ninety fathoms of chain. While in the breakers the *Corwin* shipped a very heavy sea over her starboard quarter which swept clear forward to the forecastle. Our surf-boat was made ready with a picked crew, and then, steaming ahead to windward of the *Mabel* to a full scope of chain, the boat was lowered, with Mr. Douglass, the pilot, in charge, to run a small line to the *Mabel*. Notwithstanding the heavy sea and the strong wind and tide, he succeeded in running the line in a most admirable and seamanlike manner. A large hawser was bent to the running line, but before it could be hauled on board the *Mabel* she parted her cable and drifted towards the shore. Her head sails were hoisted and every endeavor used to work her into deep water. Before she could be got about she struck very hard on the bar and then went ashore broadside on, about one

quarter of a mile north of the *George and Susan*. The sea broke over her from stem to stern, and in less than thirty minutes her masts had gone, she bilged and filled with water, and became a total wreck.

After she struck we shifted our position to a more safe and secure anchorage. At 8 o'clock that evening, when the gale had somewhat abated, a boat from this vessel, in charge of First Lieutenant Hall, accompanied by Dr. Yemans, visited the wrecked men on shore and both of the wrecked vessels. On shore the surgeon rendered valuable medical aid to those men of the *George and Susan's* crew that were suffering from the severe exposure which they had undergone.

The *Mabel's* crew abandoned the vessel after she was wrecked and took refuge in a tent which they had erected on shore, or in some of the Indian huts. Their passage to the shore was attended with great difficulty, on account of the heavy surf, and they were obliged to run a line from the vessel to the shore for the guidance of their boats.

On board the *George and Susan* the conditions were more favorable, and her crew, with the exception of those that took to the boats in the excitement when the vessel first struck, were enabled to remain on board during the night. Although she was also bilged, her between-decks and cabin were dry and comparatively comfortable.

At 11 o'clock that night, at the request of the captains of the wrecked vessels, we got under way and steamed to the northward for the purpose of asking the steamer *Belvidere* to take the oil from the *Mabel*, and the bark *Ohio* to take that of the *George and Susan*, or that portion of their cargoes that could be saved.

The *Belvidere* in response steamed down to the vicinity of the *Mabel*, but the captain of the *Ohio* said it was then impossible for him to go to the *George and Susan* on account of the head wind and tide, and that he might not be able to do so for a week.

At 2 o'clock the following morning we anchored alongside the *Ohio*, and at 4 o'clock, at the request of the captain, got under way with that vessel in tow, he being desirous of procuring, for the benefit of his owners, that portion of the cargo of the *George and Susan* that could be saved.

After towing the *Ohio* and anchoring her near the *George and Susan*, we went about to the northward toward Point Franklin to assist those vessels that had either parted or slipped their cables during the gale and had thus become virtually disabled. This assistance I deemed necessary, knowing if the wind should come from the southward the vessels would either have to go on the beach or enter the ice-pack, which in either case would prove their destruction. Owing to the ice and strong tides a vessel on the east coast is just as much disabled without anchors as if she were without a rudder. As we steamed amongst the fleet the captains of those vessels that were without anchors requested our assistance in towing them back to their anchorage. They also stated that the bark *Francis Palmer* was farthest to the northward, and consequently in the greatest danger. They were then informed that we would first go to the assistance of the *Palmer*, and on our return would take them in tow.

We found the *Palmer* brought to off Point Franklin, in close proximity to the ice, fluke-chains, blubber-hooks, and other heavy articles having been improvised for use as anchors. Seeing the dangerous position of the vessel, and at the request of her captain for assistance, she was taken by us and towed to her former anchorage off Wainwright Inlet, where she soon after succeeded in securing her anchors and cables, which she had parted during the gale.

We then steamed amongst the remainder of the fleet, but our services were not further required, as a fair wind had in the mean time sprung up which enabled the vessels to return against the tide to their lost anchors.

The three deserters from the bark *Dawn*, before mentioned as having been taken on board at Point Spencer, were returned to that vessel in charge of an officer.

Allegations having been made by the deserters against the captain of the *Dawn* concerning his treatment of them, the officer was instructed to inform the captain of the charges and to warn him that if there was any truth in them he would be held accountable by us, as it was a part of our duty to secure proper treatment of crews from their superiors.

At the request of the commanders of the two wrecked vessels for transportation for them-

NATIVES OF KING'S ISLANDS.

KING'S ISLAND, BEARING S. W. BY W.

NATIVES OF POINT BARROW.

"COAL SEAM." BRINGING OF COAL IN CORWIN'S BOATS.

selves, their officers, and crews on board the *Corwin* to San Francisco, every preparation was made to receive them and to provide for their comfort. The lockers on the berth-deck were torn down and berths erected for a part of the officers of those vessels, berths being placed in the cabin for the two captains.

The following day, August 12, we received on board a few provisions that had been saved from the *George and Susan*, also two whale-boats, which I deemed it advisable to have, our own boats being inadequate to provide for all on board in case of disaster to the vessel. That evening and the next day the captains, officers, and crews of the wrecked vessels came on board the *Corwin* for passage to San Francisco.

As the Department last year refused to reimburse the ward-room officers for providing for those officers of the *Bowhead* that had messed with them, some objections were made to receiving the officers of the two vessels at their table. There being no room forward for them, and the forecastle being entirely unsuitable for an officer, they were received into the cabin mess and fed at my personal expense, the crowded condition of the cabin necessitating the setting of a first and second table.

The crews of both vessels as they came on board were tolled off in starboard and port watches with our own crew and a Government ration served to each man. Great care was taken that no distinction should be made either in work or food between the wrecked men and our own crew.

One man was taken on board from the *Reindeer*, he being greatly in need of medical attendance and in a critical condition. He was formerly of the crew of the bark *Napoleon*, and at the time of the wreck of that vessel all the toes of both feet were badly frozen. He was taken on board the *Reindeer*, and his condition was such that his toes had to be amputated. There being no surgeon in the Arctic or within several hundred miles at that time, the operation was performed by Captain Baker, of the *Reindeer*, being resorted to as an extreme measure and one actually necessary to save life. After the man was taken on board the *Corwin* a further amputation was found necessary, and was subsequently performed in a most skillful and professional manner by Dr. Yemans. The man received the best possible care, his feet being dressed each day by the surgeon, and one of the crew was detailed particularly to attend to all his wants. He improved rapidly from the time of the operation, and on our arrival in San Francisco was sent to the United States marine hospital.

Having received on board in all fifty-four wrecked men, we got under way on the morning of August 14 and steamed to the northward, toward Point Franklin. From masthead the ice was visible from northeast to west, packed solid from the shore at Point Franklin as far as the eye could reach.

Six vessels of the fleet had in the mean time cruised toward Point Barrow, and as the ice had closed in to the southward of them, there was no way for them to get out until the wind should blow strong enough from the northeast to drive the ice off shore and leave them a clear passage to the southward. Finding the cutter could then be of no further service to the whaling fleet, we steamed to the southward and anchored off Cape Lisburne coaling station. There we procured a supply of fresh water and steamed over to the coal mine, near Cape Sabine, intending to take coal on board from the mine.

Finding the sea too rough to allow any work to be done, and it being unsafe to lay to anchor, we stood off and on under sail until the sea had gone down, and then anchored off the mine at 5.40 a. m., August 17. The remainder of the day and until 10 o'clock that night the crew were employed in watches coaling ship, and we received on board about seventeen tons of steaming coal.

At 4 o'clock the following morning, as I was very anxious concerning the condition of the vessels around Point Barrow, we got under way and returned to the northward. We anchored under Icy Cape that evening, and arrived off Wainwright Inlet August 19.

The steamer *Orca* and the bark *Mary and Susan*, two of the six vessels that were shut in by the ice, succeeded in striking a lead and working their way into clear water. Their escape was attended with considerable danger and difficulty, and, as they were obliged to keep close to the shore while working their way out, both vessels struck the bottom several times.

From the captains of those vessels I learned that the four whalers left farther north were then in no immediate danger. They were anchored behind the ground ice between the Sea Horse islands and Point Barrow, and, as before stated, would be compelled to remain until the wind should drive the ice off shore.

Having thus learned of the safety of the vessels, and finding our services were not likely to be required further, considering also the crowded condition of the vessel, we got under way August 22 and started on our way to the southward. Before leaving the whaling fleet two of the *Mabel's* crew shipped on board the schooner *Page* for the remainder of the whaling season.

On our way south we cruised along the shore, touched at Cape Lisburne coaling station, Point Hope, Cape Thompson, and Chamisso Island, and on August 27 anchored off Hotham Inlet.

At Point Hope First Lieutenant Howison was detailed to visit the Indian village. He found it temporarily deserted, as all the natives had gone either inland to hunt or farther down the coast to fish, in both cases to make provisions for the coming winter. While Lieutenant Howison was visiting the village, three men of the boat's crew, all formerly belonging to the *Mabel*, entered some of the huts, stole whatever trinkets they could find and brought them on board. Although the articles were of very little value, they were returned to the huts on shore, and the men confined in irons as a punishment for their action. No such depredation has since been committed by any of the men brought down by us.

At Cape Thompson we took fresh water on board, and this was done whenever the opportunity offered, as I deemed it necessary to keep a full supply on hand, on account of the large number of people on board.

At this and at all subsequent places where fresh water could be obtained, soap was served to the men and they were compelled to go ashore and wash themselves and their clothing. Some of the men comprising the whalers' crews were the filthiest I have ever seen, and seemed to have no idea of personal cleanliness. The duty of making them keep themselves and clothing clean, in order to avoid a contagion which filth might cause in such crowded quarters, was anything but pleasant. One man, who I think was partially insane, was literally covered with vermin, as were also several others of the crews of the wrecked whalers.

At Chamisso Island no fresh water could be obtained, although in previous years I have found it an excellent watering station.

On our arrival at Hotham Inlet the expeditions which had been sent to explore the Kowak and Noätak Rivers, the former under Third Lieutenant Cantwell and the latter in charge of Second Assistant Engineer McLenegan, returned on board, having in both cases fully accomplished the objects for which they were sent.

Lieutenant Cantwell's party consisted, besides himself, of Mr. C. H. Townsend, naturalist of the Smithsonian Institution; W. G. Marsh, seaman; F. Lewis, fireman; Myninck, the Indian interpreter, who was taken on board at St. Michael's; and from six to ten Indians, as occasion required during the expedition.

The steam-launch being too small to take all of Lieutenant Cantwell's supplies besides his party, he procured a large skin boat from the Indians, and was thus enabled to take his entire outfit.

Assistant Engineer McLenegan was attended by seaman Nelson only, as he was unable to get an Indian to accompany the expedition. The skin boat which was obtained at Ounalaska was used by him and his companion in their exploration.

Both expeditions experienced many difficulties and hardships, which at times seemed insurmountable. Their perseverance and labor overcame their trials, and they succeeded in reaching the head of canoe navigation of both rivers; a feat which was never before achieved, and one which has hitherto been considered impossible of accomplishment in the time given.

Detailed reports of the expeditions are being prepared, and will be forwarded to the Department as early as possible.

Mr. Townsend, while on the Kowak River, succeeded in making ornithological, ichthyological, and entomological collections which will prove of much value to science, and which, with his report, will be submitted to Professor Baird, of the Smithsonian Institution.

POINT HOPE. ESQUIMO GRAVES.

POINT HOPE. ESQUIMO HOUSES.

On the return of the expeditions to the *Corwin*, the Indians who had accompanied Lieutenant Cantwell and all the natives who had in any manner assisted the expeditions were remunerated in Government trade goods, which had been taken up for that purpose.

When we were at Hotham Inlet, on the 4th of August, we found about a thousand Indians rendezvoused, having come from the interior and from all along the coast, for the purpose of bartering, and also to catch and dry salmon for their winter's use. This time, however, we found very few Indians remaining in the vicinity, the greater part having returned to their homes when their trading and fishing were ended.

August 28 we left Hotham Inlet, and at 4 o'clock that afternoon anchored off Schismareff Inlet. Two of the officers of this vessel and four of the officers of the wrecked whalers went ashore, and about two hours were spent in hunting.

Small feathered game in abundance was found at Schismareff Inlet, as at many other places along the Arctic shore, the birds frequenting the vicinity of marshes or fresh-water ponds.

We left Schismareff Inlet on the return of the hunting party, passed Cape Prince of Wales the following day, and anchored off our coaling station at Point Spencer that evening. There we coaled and watered ship, and sent all the crew on shore at the watering station to wash their clothing.

As that was the last time during the year that the coaling station would be visited by us, the scow was hauled up on the beach above high-water mark, and that and everything belonging to the Government made as secure as possible.

The coal pile was carefully trimmed and measured, disclosing a deficit of about one hundred and twenty tons. This discrepancy, with the apparent and probable causes thereof, was made the subject of a letter by me to the Department, diagrams and measurements, made by Chief Engineer Kelly, having been forwarded at the same time.

The watering station which was established by us last year at Port Clarence has proved of inestimable value, not only to us but also to that portion of the Arctic whaling fleet that rendezvous at Point Spencer. Besides being free from all foreign or injurious matter, it is very easy to obtain; the stream runs down from the hills and empties into a basin on the shore, but a few feet above high-water mark.

We left Point Spencer at midnight of September 1, the fog shutting down thick soon after taking our departure.

King's Island and Sledge were sighted in the fog, and at half past 8 on the morning of September 3 we anchored in Golwin Bay.

First Lieutenant Hall and Surgeon Yemans were sent to visit the schooner *Bonanza*, which was then loading ore that was sent down from the mine. On inquiry they ascertained that the health of all the mining company was excellent, and that the relations existing between the miners and Indians were most friendly. Aside from this no information could be obtained. On the subject of the mine or its prospective yield they were decidedly reticent, and no amount of inquiry would reveal anything of importance.

After the return of Lieutenant Hall and Surgeon Yemans we got under way and shaped our course for St. Michael's.

On our arrival there, Myninck, the Indian interpreter, who had accompanied the Kowak River expedition, was discharged and paid in Government trade goods and money, the latter being advanced by the Alaska Commercial Company's agent, on an order on the collector of customs at San Francisco.

On the same day H. T. Allen, second lieutenant U. S. A., and Mr. J. W. Garland, an English tourist, visited the vessel, and both made a request that transportation be given themselves and their companions from St. Michael's to San Francisco on board the *Corwin*.

Lieutenant Allen's party consisted of Sergeant Cady Robinson, U. S. A., and Mr. F. W. Fickett, of the United States Signal Service. They left Sitka in March last, and, acting under orders from the War Department, ascended the Copper and Tannenah Rivers. After many hardships they succeeded in exploring a portion of Alaska that had never before been explored or visited by white men, thereby accomplishing a feat which has hitherto been declared impossible. Lieutenant Allen and his companions arrived at the Yukon River in time to take

passage down the river to St. Michael's on the steamer *Yukon*, in the employ of the Alaska Commercial Company.

Mr. Garland was accompanied by Mr. F. R. Beatty, and together they traveled across the continent from the Great Slave Lake to the Yukon River. Their only object in starting on the journey was the pursuit of pleasure, such as was afforded them in hunting and fishing, and in the extreme novelty of their trip. On reaching the Yukon River they also took passage on the steamer to St. Michael's. The last steamer of the year had sailed from St. Michael's several days in advance of the arrival of the *Yukon* at that place, and the *Corwin* was the only vessel on which Lieutenant Allen and Mr. Garland could hope to obtain passage for themselves and companions to San Francisco before July of next year. These facts being known to me, I granted their request for transportation to Ounalaska or San Francisco, as might thereafter seem best.

The addition to our already crowded vessel was five; but as all except Mr. Fickett messed with me, if there was any inconvenience experienced by their coming it came upon myself alone. I found, however, that there was ample room and accommodation for them, and I experienced no discomfort by their presence; on the contrary, I found them very pleasant and agreeable companions in every way.

Lieutenant Allen and Mr. Garland slept in the cabin on the transoms and Mr. Fickett occupied a swinging cot in the ward-room. Sergeant Robinson slept in the pilot-house and Mr. Beatty slept in the steam-launch on deck. Mr. Fickett ate in the ward-room, and the others, as I have before stated, messed with me, and in no way was any expense imposed on the Government by reason of their being on board.

On the 5th of September we left St. Michael's, encountered a strong southerly gale and heavy head sea, and three days later anchored off Hall's Island, where a hunting party went on shore for the purpose of killing a polar bear. A minute description of the hunt as it appeared to an observer, necessarily differing in the extreme from what was experienced by the hunting party, would contain too much of the ludicrous to embody in an official report. Mr. Townsend, who was one of this party, succeeded in killing a large polar bear, which was skinned and brought on board, and will soon be exhibited at the Smithsonian Institution in Washington.

Another party from the vessel visited the vicinity of the west end of Hall's Island for the purpose of hunting walruses. A large number were seen, but owing to the roughness of the sea and the rocky nature of the shore none were captured.

The following morning we left Hall's Island, rounded the east end of St. Matthew's Island, and shaped a course for St. Paul's. While we were in the vicinity of the seal islands a lookout was kept at masthead for vessels cruising, sealing, or illicitly trading among those islands, but no such vessels were seen.

The next evening we anchored off St. Paul's Island. Second Lieutenant Benham and seamen Thompson and Ericsen rejoined the vessel, having a few days previous gone over to St. Paul's from Otter Island, at which place they had been left in June last for duty during the sealing season.

Mr. Townsend left the vessel and went ashore at St. Paul's to complete the work which was begun by him before his passage north on the *Corwin*.

Mr. Tingle, the Government special agent, with a representative of the Alaska Commercial Company, came on board, and both stated that during the absence of the *Corwin* in the Arctic, vessels had been cruising in sight of the island for the purpose of killing seals; but, anticipating the *Corwin's* return, and the heavy weather incident to the lateness of the season, none had been seen within three weeks of that time. These gentlemen estimated that about fifteen thousand seals had been killed by the marauding vessels. I shall deal further with this subject in my report, treating it as a separate topic.

At 5 o'clock in the morning of September 13 we left St. Paul's and steamed toward St. George's. Arriving off that island, we found that owing to the strong winds, which had been blowing several days, the sea was too rough to allow a landing on the island.

Continuing on to the southward in a dense fog, at 2 o'clock of the 14th we anchored off

Dredgings were also made at intervals during the cruise, or as often as the nature of the bottom would permit, and quite a collection of specimens, including some that are new, were obtained. These specimens were preserved in spirits, and on our arrival at San Francisco were forwarded to the Smithsonian Institution, where they will be properly identified and classified.

MEDICAL AID IN THE ARCTIC.

The value of the services of a medical officer in the Arctic cannot be too highly estimated, the attendance on the officers and crew of the *Corwin* forming but a small portion of the duty which he is called on to perform. The Alaska Commercial Company employs one doctor at Ounalaska and two at the seal islands, but they are so far removed from the Arctic that their services are seldom, if ever, called into requisition by any of the whaling fleet. The crews of the fleet comprise upwards of one thousand men, and a large percentage of these are annually treated by the medical officer of the *Corwin*.

When the *Corwin* first went north the Indians had a great repugnance to receiving medical attendance from a doctor, but would resort to their shaman to cure all their ailments. Now, however, the doctor is sought by them in all their ills, and their faith in his power is truly surprising.

FISHERIES OF ALASKA.

In relation to the salmon and cod fisheries of Alaska mentioned in my report of last year, I have but few remarks to add.

It is almost impossible to conceive of the immense quantities of these fish that abound in the Alaskan Territory, principally in the waters adjacent to Bristol Bay. Fish canneries have been established along the bay, and the enterprise is destined to become one of the leading industries of Alaska.

From people who are interested in the undertaking I learn that the yield of salmon in the Koskoguim and Mishagak Rivers, tributaries of Bristol Bay, exceeds that of the Columbia River, and that they are of a quality not excelled by any. The yield of codfish in the bay is nearly as great as that of salmon. It is a matter of great regret that the labors of our Coast Survey vessels have not been directed to these waters.

No thorough or reliable survey has ever been made of the rivers, and it is sincerely to be hoped that the Government will cause a survey to be made of that portion of the country, and thus by its assistance add an impetus to navigation and a stimulus to the new enterprise.

Capt. C. T. Hague, with the steamer *Dora*, ascended the Koskoguim River as far as latitude 59° 52′ N. the past summer, and he is of the opinion that the river is navigable for a distance of fifty or one hundred miles farther up than that point, but it requires proper survey and delineation.

THE SEAL FISHERIES.

In previous reports I have called the attention of the Department to the importance of greater protection to seal-life in Alaskan waters, and especially in the vicinity of the Pribyloff Islands.

Last year the schooner *Adele* was seized by an officer connected with this vessel for unlawfully killing seals and delivered by him to the United States authorities at San Francisco. Instead of being forfeited, as provided by section 1956, Revised Statutes, she was subsequently released on technical informalities.

The same vessel has pursued her illegal occupation during the past summer, and her release from justice has very generally led to the belief that the seizure of the *Adele* was an act unwarranted by law.

Other vessels had previously been seized for the same offense, but in no instance has punishment been inflicted. The Department can readily see what the result will be if this state of affairs be allowed to continue.

During the year quite a number of vessels have raided Alaskan waters for seals and other fur-bearing animals. Among the number the following, with their catches, are noted: *Look-*

out, 1,100 seals; *Mary Ellen*, 2,309 seals; *Favorite*, 2,065 seals; *San Diego*, 1,725 seals; *Sierra*, 1,312 seals; *Vanderbilt*, (about) 1,000 seals; *Henrietta*, (about) 1,200 seals; *Alexander*, 660 seals and 107 sea-otters; *Otter*, a few seals and about 50 or 60 sea-otters, with the *Adele* and other vessels yet to hear from. Thus it will be seen that upwards of ten vessels were engaged in unlawful sealing in Alaskan waters during the present year, and I am convinced that next year the number will be considerably increased.

Rumors are current here that the American consul at Victoria has informed different people that they are not prohibited by law from sealing in Alaskan or other waters, provided they keep more than three leagues from the shore. Encouraged by this decision and the success of the marauding sealers during the present year, parties in Victoria are fitting out vessels (two or three being steam schooners) to engage in the business next year. Not only are seals killed out of season, but they are shot in the water, and young and old, male and female, killed indiscriminately; all in direct violation of sections 1960 and 1961, Revised Statutes, and all tending, if allowed to continue, to drive the seals from their regular haunts.

Skins so obtained are shipped to London as Victoria skins, and on their return to this country, after dressing and dyeing, are invoiced at a price far below their actual value to avoid the payment of legitimate duties. The Government, by this means, loses about $1.50 on each skin so invoiced, and on the catch of the present year is defrauded to the amount of about $20,000 on duties alone. In addition to this, the royalty of $2.50 per skin, as provided by section 1969, Revised Statutes, is not paid, the Government thereby being defrauded of many thousands of dollars additional.

In view of the foregoing facts, I would respectfully suggest:

First. That the Department cause to be printed in the Western papers, particularly those of San Francisco, Cal., and Victoria, B. C., the sections of law relating to the killing of fur-bearing animals in Alaskan waters, and defining in specific terms what is meant by Alaskan waters.

Secondly. That a revenue-cutter be sent to cruise in the vicinity of the Pribyloff Islands and Aleutian group during the sealing season.

One vessel cannot protect those islands and visit the Arctic Ocean besides. The cruising ground is far too extensive, covering as it does a distance of several thousand miles, and while the cutter is absent in the Arctic much damage can be done by marauding vessels to the seal islands.

The presence of a cutter is needed in the Arctic to look after the Indians and to prevent the illegal traffic in liquor. The whaling fleet, representing as it does hundreds of thousands of dollars and over a thousand lives, exposed to the rigors and hardships of that frozen country, calls for some protection on the part of the Government, a fact which is attested by the services rendered the fleet during the past few years.

Since the Territory of Alaska was ceded to the United States no officer of the Government has been on official duty in Alaskan waters more than I, my first assignment having been in 1868. From personal observations covering most of the time from that date to the present year, I can truly say that the condition of the natives has improved in a remarkable degree since the Alaskan Commercial Company has obtained the lease of that portion of the country from the Government. Before the company assumed control of the seal islands the natives were but little in advance of the Indians of Alaska. Their habitations were formerly mud huts, and their food and clothing such only as the country afforded. Education, even of the most primitive nature, was unknown and undreamed of, and they, being satisfied to live from day to day, gave no thought whatever of the morrow. Their huts have now given place to comfortable frame houses, giving them an air almost of luxuriance, when compared with their former abodes. Carpets, furniture, and the ordinary comforts of the middle classes in the United States form the rule of the furnishings of their houses. In dress they border on the extravagant, silks with the women and broadcloths with the men being not infrequent, while many of the latter have neat sums of money placed to their credit.

Schools are maintained on the islands, and attendance at them is compulsory. A church

GROUP OF FUR SEAL, ST. PAUL ISLAND.

ST. PAUL'S ISLAND. KILLING FUR-SEAL.

ST. PAUL'S ISLAND. SEAL ON KILLING GROUND.

FUR-SEAL ON BEACH, ST. PAUL ISLAND.

costing $13,000 was erected on St. Paul's Island, and is now almost clear of debt, the money having been advanced by the Alaska Commercial Company,

A doctor is employed on each of the islands of St. Paul and St. George, and at Ounalaska, solely for the care of the natives.

The general air of cleanliness, happiness, comfort, and prosperity attest in indisputable terms that the Alaska Commercial Company have and do fulfill their obligations towards these people in a most scrupulous and conscientious manner, and the result might, I am sure, excite the wonder and envy of many missionaries laboring among a similar class.

THE WHALING FLEET.

The whaling fleet during the past year consisted of forty-two vessels, thirty-three of which visited Bering Sea and Arctic Ocean. Eighteen of the Arctic whalers hailed from New Bedford, Mass., and the remainder from San Francisco, Cal.

Although all the vessels met were subjected to a very thorough examination, no evidences of liquor or other commodities intended for illicit traffic were discovered, the reason being, as has before been stated, that all the whalers which did engage in contraband trade had disposed of their illegal goods before entering the United States domain. A majority of the fleet have been more or less damaged by ice during the present year, and five vessels suffered total loss. The bark *Rainbow* was crushed in the ice April 15, and the *Gazelle* and *Napoleon* met with a similar fate. The *Gazelle* was wrecked June 3 about twenty miles SSE. of Southwest Cape, St. Lawrence Island, and her crew and also the crew of the *Rainbow* were rescued and distributed among the vessels of the fleet. The *Napoleon* was wrecked in latitude 61° 30′ N., longitude 177° 40′ W., and the first and third mates, with twenty of her crew, were either drowned or frozen to death. The remainder were rescued, and they also were divided among the vessels of the fleet. The barks *George and Susan* and the *Mabel* were wrecked off Wainwright Inlet August 11, a detailed account of which has already been given in this report. Up to date of writing, all the Arctic fleet with the exception of the bark *Amethyst* have arrived in San Francisco.

The catch of the season by vessels of the New Bedford fleet is one hundred and twenty-two bowhead and twenty-three right whales, and that of the San Francisco fleet is one hundred bowhead and twelve right whales. This makes a total catch (not including the *Amethyst*) of two hundred and fifty-seven whales, which compares very favorably with the work of previous seasons, and is more evenly distributed than has heretofore been the case.

Considering the many dangers to which the Arctic whalers are exposed, it seems almost a miracle that more vessels are not lost each year, and this fact speaks volumes in praise of the skill and professional ability of the captains and officers navigating those vessels. In reality, the captains and officers of the Arctic whaling vessels, as seamen, cannot be excelled, and as a class are my beau ideal of the American seaman.

CROWDED CONDITION OF THE VESSEL.

It is almost impossible to convey any more than a vague idea of the crowded condition of the vessel before her return to San Francisco. Four people occupied berths on the cabin transoms, and in the ward-room all the state-rooms were filled, and three cots suspended from the deck beams. One berth was made in the pilot-house, and two in the steam-launch on deck. The store-room and sail-lockers on the berth-deck were torn down, and berths erected for the accommodation of the officers of the whale ships. The quartermasters berthed in the oil-lockers, and the firemen and coal-passers were obliged to sleep in berths erected in the shaft alley. Owing to this crowded condition it was necessary to divide the crews of the wrecked whalers into two watches, and have them perform duty with our own crew. This course was necessary, not only to provide sleeping accommodations for all hands, but also to keep the vessel in a proper sanitary condition. As the men came on board they were mustered on the quarter-deck, and the situation explained to them. They were told that they were to work in regular watches, and that they would at all times while on board be subject to the rules governing the discipline of

the vessel. All accepted the situation, notwithstanding the fact that some of them could have shipped on other vessels of the whaling fleet for the remainder of the season, had they chosen.

No distinction was made either in work or food between the wrecked men and our own crew, and every effort was made to contribute to the comfort of the new-comers. Even the private stores of the *Corwin's* crew were by my orders shared equally among all. For a time the men were satisfied with their lot, but soon began to show signs of dissatisfaction. Several mutinous demonstrations were made by them while they were on board, but as they were always met with a firm hand, serious results were avoided.

It gives me great pleasure to attest to the manliness and humanity exhibited by the *Corwin's* crew during the trying ordeal, each vying with the other in their endeavor to aid their unfortunate fellow-mariners. Their food was shared cheerfully, and some of their clothing that could not be well spared was given to the wrecked men. "Man's inhumanity to man" was forcibly exemplified in the treatment they received in return on the part of some of their beneficiaries.

CONCLUSION.

It is generally understood that the *Corwin* is to be relieved by the *Bear* for Arctic duty. If such a change is contemplated, before it is made I would respectfully call the serious attention and consideration of the Department to the fact that nineteen feet of water, which I understand is the draught of the *Bear*, is altogether too great to make her an effective cruiser on the shore of the Arctic Ocean. With such a draught, all effectiveness as a cruiser against contraband trade and as an aid to vessels that might become stranded would be seriously impaired if not totally destroyed.

In my opinion a greater draught than twelve or thirteen feet would be a hindrance to effective service. The *Corwin* has performed this work during the last five years exceptionally well, and, in my opinion, she is admirably suited for the duty. It is true that when she has a large number of people on board, as has been the case the past two seasons, she is very much crowded, but the efficiency of the vessel as a cruiser is not at all impaired, the only inconvenience being the personal discomforts. It is reasonable to suppose that this crowded condition of the vessel will occur only occasionally; and any officer would prefer an efficient vessel, even though crowded, to one having the greater and more serious impediment of an overdraught.

The new *Rush*, being a larger vessel than the *Corwin*, has that single advantage over her, and might be a very serviceable vessel for Arctic duty; but it is not reasonable to suppose that the Department would go to the unwarranted expense of sheathing the new vessel and providing her with an ice-breaker when the *Corwin* is already so fitted. Even if the *Rush* was so provided the only known advantage would be in larger quarters; and I am positive that she cannot excel, if she can equal, the *Corwin* in combined sailing, steaming, and sea-going qualities.

The necessity of having two vessels cruise on the Alaskan northwest coast has been frequently and strongly mentioned to the Department. The water from the seal islands south, around the Aleutian and Shumagin groups, and also around Kodiak and Southeastern Alaska, is bold and deep, and can be navigated, so far as water is concerned, by vessels of the greatest draught, and to me it appears that the *Bear* would be well adapted for that duty.

It must be obvious to the Department that it is impossible for one vessel to cover the entire cruising ground in Bering Sea and Arctic Ocean, embracing as it does an extent of over seven thousand miles.

Having cruised for a number of years in every portion of Alaska, from Sitka to Point Barrow, and among all the islands, and served on this duty much longer than any other person under the Government, I should understand the needs of the country in this respect; therefore the foregoing suggestions are made as a matter of duty only, and with becoming deference and hesitation.

Very respectfully, your obedient servant,

M. A. HEALY,
Captain, U. S. R. M.

Hon. DANIEL MANNING,
Secretary of the Treasury, Washington, D. C.

ST. PAUL'S. ISLAND ROCKS AND SEALS.

ST. PAUL'S ISLAND. YOUNG SEALS.

PAPER I.

A NARRATIVE ACCOUNT

OF THE

EXPLORATION OF THE KOWAK RIVER, ALASKA,

UNDER THE DIRECTION OF

CAPT. MICHAEL A. HEALY,
COMMANDING U. S. REVENUE STEAMER CORWIN.

BY

THIRD LIEUT. JOHN C. CANTWELL,
U. S. R. M.

1885.

LETTER OF TRANSMITTAL.

U. S. REVENUE STEAMER CORWIN,
San Francisco, Cal., October 15, 1885.

SIR: Herewith is respectfully transmitted a preliminary account of the explorations of the Kowak River, Alaska, together with photographs and sketches made by me in that region.

The report on the natural history is under preparation by Mr. Charles H. Townsend and a copy will be delivered to you as soon as completed.

I feel sure you will understand the difficulties under which I have labored in attempting to compile the data which we have been at such pains to collect, and in consequence deem it almost unnecessary to ask your indulgence for its many imperfections.

I desire to place myself on record as being under great obligations to you for every favor that has been shown to me in the matter of the explorations. Much, if not all, of the honor of being the pioneers at the headwaters of the Kowak is due directly to your forethought and the example you set me of well sustained and indomitable energy. I thank you for this and for all your kindness, and beg to subscribe myself,

Very truly and gratefully, your obedient servant,

JOHN C. CANTWELL,
First Lieutenant, U. S. R. M.

Capt. M. A. HEALY,
Commanding U. S. R. S. Corwin, San Francisco, Cal.

U. S. REVENUE MARINE EXPLORING PARTY, KOWAK RIVER. 1885.

KOWAK RIVER, ALASKA.

THE EXPLORATION OF THE KOWAK RIVER, ALASKA.

On the 2d of July, 1885, the second expedition for the exploration of the Kowak River, under the direction of Capt. M. A. Healy, commanding the U. S. revenue-cutter *Corwin*, left that vessel off Hotham Inlet, Alaska, and headed in towards the land. Fortunately the sea was smooth and the boats of the expedition crossed the bar and reached a good harbor in safety.

In addition to the steam-launch of the *Corwin*, a native skin boat, about twenty-eight feet in length, was procured to transport our camp outfit and an extra supply of coal which we brought along. We expected to find at this place the Indians' rendezvous for their summer trading, but none had as yet arrived, and we experienced some difficulty in getting a suitable boat and an additional number of Indians to accompany us up the river. However, I induced one man to forego the pleasures of the rendezvous to go with us, and with a rickety apology for a boat, loaded down to her rail with coal and stores, we started up Hotham Inlet toward the mouth of the Kowak. A brisk northwest wind sprang up and rapidly increased to half a gale after we had fairly got started. The conformation of the shore is such that no protection can be had for small boats with the wind in this direction, and our only hope lay in reaching the mouth of the river before a heavy sea was made in the inlet.

Our sail was hoisted and with the skin boat in tow we sped away, keeping as much as possible under the high bluffs on the west side of the inlet. In rounding the points which project from this side of the bay, however, the deeply loaded boats were nearly swamped, and our Indians were very much afraid that the old skin boat would be pulled to pieces by being towed so fast. All hands were kept bailing, and the steam-launch was kept free of water with the aid of the steam-pump, steam being used for this purpose only, and at 3 o'clock a. m. of July 3 we reached a point opposite a mouth of the river which I explored last year, and bringing our marks in range, we made a bold dash across the now rough inlet, and in a few moments found ourselves safely between the low green banks of the stream. No one had as yet had any sleep, and I therefore arranged the party into two watches, to relieve each other every six hours, and in this way avoided the necessity of stopping to camp.

Before leaving San Francisco, several additions had been made to the launch, which were suggested by the experience of last year's work. Among them the most noticeable, as contributing to the rapid advance of the party, were the following:

(1) A sheet-iron stove, made to fit in forward of the boiler.

(2) The enlargement of the furnace.

(3) An arrangement of the exhaust-pipe by which the feed water was heated before entering the boiler.

In addition to these improvements, it may be noticed that the extra supply of coal brought along saved us the necessity of stopping to cut wood. It will be seen, therefore, that our outfit was most complete and we were enabled to eat and sleep while advancing at the rate of seven knots per hour.

The lower part of the river being entirely free from obstructions, and having but little current, we made rapid progress, stopping once only, at an Indian settlement about thirty miles from the mouth of the river, to leave our mast and sails, a supply of coal and provisions, to form a

base of supplies in case of any accident, and at the end of two days we reached that part of the river where it leaves the vicinity of Deviation Peak and trends to the southward toward the mountains lying between the Kowak Valley and Selawik Lake region. Upon comparison I found that this point was reached after ten days' tedious work in 1884, and the fact gave us all considerable pleasure.

At the lower rapids the Indians of a fishing village, situated just above, met us and seizing the tow-line of both boats dragged us through the hardest places, with many manifestations of delight at seeing us again. I recognized many old friends, and was in turn recognized by them, and was cordially invited to remain at the village for a while. I stopped long enough to distribute some trifling presents and then proceeded.

On July 4 our patriotic fervor was somewhat dampened by a steady downpour of rain, which lasted all day and caused the river to rise rapidly. Towards night we reached the second rapids, where coal was first discovered by me last year. Here we encountered a heavy current, and with difficulty got through. Some twenty Indians of the fishing village accompanied us and afforded us great assistance at this point. Once past this stiff portion of the river the little launch puffed steadily away, and mile after mile of the now familiar shores were left behind.

On July 5 our supply of coal gave out, and we were compelled to stop for wood and make our first camp, on a sand-spit about ten miles below the point where I abandoned the launch in 1884.

We had now reached that part of the river where it winds around the foot of the Jade Mountain and then goes wandering away more toward the southeast. In this vicinity the width of the stream is greater than at any other portion of its course. In some places it measures at least eight hundred yards.

It was with a great deal of anxiety that we watched the steam-gauge after our coal had become exhausted and we commenced to burn wood, and when the dial indicated a steady pressure of eighty pounds I knew we had nothing to fear. A great deal of inconvenience was suffered during the trip made with the launch in 1884, owing to the quantities of sparks coming from the funnel. This year no sparks at all came out, which I attribute to the fact that the exhaust steam, being led into the funnel, effectually extinguished them. About noon of the next day we stopped at some high sand dunes to cut wood. Opposite us the Jade Mountain could be easily distinguished from the surrounding peaks by its peculiar greenish color.

Photographs of this range, extending from Deviation Peak nearly east toward the interior, were obtained.

An old winter habitation was discovered a short distance from the river, and Mr. Townsend and I proceeded to examine it. The spot had no doubt been selected on account of its sheltered situation. The densely wooded ridges running in on the river surrounded the collection of huts almost completely, and approach to the village was made by way of a narrow trail leading from the river. The houses were built by excavating a square hole five feet deep and from twenty to twenty-five feet square. Stakes or piles of spruce were driven close together along the walls, and long poles were then laid across the top, forming the roof of the house. The necessary pitch to shed rain was obtained by covering the outside with earth arranged in such a manner as to produce a mound-shaped structure. We pushed aside the tall grass which choked the entrance and crawled on our hands and knees along a narrow passage just large enough for one at a time, until we reached the large chamber which doubtless constituted the living room. A small square hole in the middle of the roof furnished us sufficient light to see the interior. On the floor, along the sides of the walls, if I may so call them, were laid small willow wands, upon which the inmates were accustomed to lay their skins and sleep. In the center a square space was left, where could be seen the charred sticks of a long-extinct fire. We set fire to a few dry sticks, and the smoke shot up in a straight column through the opening in the roof, showing that defective flues are a source of annoyance not yet known to the natives.

We were glad to escape from the close, moldy atmosphere of the place and emerge once

KOWAK RIVER, ALASKA. FRAME FOR TENT.

KOWAK RIVER, NEAR FIRST RAPIDS.

more into the clear, warm sunshine; and as we contemplated the beauty of the day I could not help but think how terribly dreary and desolate life must be in such a hole when the sun had gone to the far south and the iron grasp of the long Arctic night was laid upon the silent earth.

In the mean time the sound of the ax and saw was waking the echoes of the silent hills, and the birds, aroused by the strange commotion, fluttered nervously through the dense foliage, becoming easy victims to Mr. Townsend's insatiable desire for specimens.

All day we steamed ahead, gradually leaving the Jade Mountain behind us and approaching the mountains dimly visible in the southeast. Toward night we reached the remarkable high clay bluffs running in on the river from the south. This marks the spot where a portage exists, whereby a short range of mountains bearing south from the Jade Mountain can be reached in one day. This range separates the Kowak from the Selawik River, or rather from its north branch, as it is divided some 150 miles from its mouth. The course of the Kowak is here east-southeast by compass.

A light rain set in during the afternoon and steadily increased until about 10 p. m., when it ceased long enough to enable us to camp.

I am convinced by the evidence of the natives that close communication could be established between the Selawik, Kowak, and Noätak Rivers at this point. It is more than probable that the course of the latter stream is nearly parallel to that of the Kowak, and is separated from it by the range of mountains of which the Jade Mountain is a remarkable feature. It is also more than likely that the Noätak turns here more to the northwest and continues this course until brought up by the coast range, when its course is changed toward the south, and it so continues to flow until it empties into Hotham Inlet.

All night the rain came down in a steady stream, and the river rose so rapidly that I feared our camp would be washed away. When we turned out in the morning the members of the party emerged from their wet blankets like half-drowned rats, cold, wet, and miserable, and caused me to wonder if the originator of the expression, "Put a wet blanket on it," ever had any practical experience of the full force and significance of the simile. Several times during the day before all of the party were compelled to get overboard and shove the launch off a sand-bar, and in doing so were wet through and through; but these discomforts were treated with indifference. It was only when the rain steadily poured down and flooded their sleeping quarters that the party seemed dejected; and I was not surprised when I turned out that they came forward in a body and, like Oliver Twist, requested more nourishment. I cannot say that I experienced as much indignation as Mr. Bumble is reported to have felt in the case of Oliver, and an additional allowance of coffee was served out. The sun soon came out, and having eaten a hot breakfast the natural buoyancy of the party asserted itself and the night's discomforts were forgotten.

During the morning we passed the village Un-nah-tak, but no natives were observed, they having as yet not taken up their quarters for the summer's fishing. After the rain myriads of mosquitoes came out of the swampy lands, and our lives were made miserable by these pests. A slight relief was obtained by covering all exposed parts of the body with a thick varnish made of tar, gum arabic, and olive oil; but even with this disagreeable preventive our sufferings were simply indescribable.

Toward 4 o'clock the rain began again, and when we stopped to camp, at 10 p. m., the very flood-gates of heaven seemed to have been opened. Our camp was made under the protecting branches of a dense growth of spruce which bordered the stream. The timber along this part of the river is as heavy as seen anywhere; the trees are from eighty to one hundred feet high, and from ten to fourteen inches in diameter. Some trees were observed much larger, but they formed the exception to the general rule.

The morning of July 8, the anniversary of the departure from the *Corwin* of the first expedition for the exploration of the Kowak, was ushered in by a terrific rain-storm, made doubly disagreeable by a strong southeast gale which blew directly in our faces, and our progress was necessarily very slow and tedious. The shores of the river were as widely separated as ever during the day's advance, but the channel became narrow and intricate. Sand-bars, extending in every direction, and gravel beds made the work of finding the channel very difficult. About noon

we entered a reach of the river, some five hundred yards wide, almost completely choked with sand-bars, and although I had set up ranges for the channel last year, it had so completely changed that it was not until 4 o'clock that we finally got through. The current at this place was from five to six knots per hour and increasing with the rise of the river. At this point and in the vicinity of the Jade Mountain the Indians of the river seem to rendezvous for the summer fishing; but on account of the prevailing high water but little work has been done so far in that direction.

It is difficult to describe each day's advance and avoid repetition. For hundreds of miles after leaving the delta, with its broken perpendicular banks of black silt-like earth, the country is the same low, rolling tundra land, backed to the northward by a chain of mountains extending from the coast eastward as far as the eye can reach. Sometimes we wander away toward the south and bring short, detached ranges of rugged mountains into view; but soon the river, as if tired of these lesser heights, seeks once more the shadows of the more pretentious range. For a long distance in this locality the timber along the river bank is scarce, and sometimes for hours we steam past level plains with not a sign of a tree or plant except the ever-present Arctic moss. The banks of the river here are from ten to fifteen feet high, and composed largely of ice. At half past 11 we reached an island, a short distance above the highest position reached by me in 1884, and camped. The continued rains have caused a freshet in the river, and it is now filled with driftwood and débris from the shores. Now and then we pass deserted Indian villages which had been washed out, and not infrequently we meet a *tepee* or summer hut, reminding one very much of an immense inverted wicker basket, floating away toward the sea. Upon the upper end of the island, where we camped for the night, a previous flood had deposited a huge pile of driftwood, which we soon converted into a bonfire. Worn out, wet, and chilled through by the hard day's work in the boats, we stretched ourselves around the fire, and soon only the roar of the flames as they shot straight up in the still air, and the murmur of the river as it raced past the island, broke the solemn stillness of the night.

As usual, we began work next morning in the midst of a rain-storm. The river rose a foot during the night, and the large quantity of driftwood coming down stream showed that it was still rising. I observed among other drift-stuff a piece of sod twenty feet square, upheld by the buoyancy of the willow roots it contained. At half past 9 we reached a fishing village situated on a gravel beach at the lower end of a large island in the river. Here I met several natives whom I saw at the village of Um-nok-a-luk-ta in 1884, and I induced three of them to accompany our party. The father of the bucks, a gray-haired Indian, informed me of the difficulties we would experience in reaching the headwaters of the river, saying that the natives never attempted to carry their boats higher than a place which he described as being perfectly impassable with boats. Opposite this village a branch of the river flows in at such an angle as to form a very dangerous whirlpool. Our whole expedition would doubtless have suffered wreck here had not the natives warned us to keep close to the other shore. During very great freshets the Indians say that this whirlpool becomes exceedingly dangerous, and that large trees are drawn out of sight when caught within its vortex.

The timber along the river banks in this locality again becomes plentiful, and for long distances forests of spruce, pine, and larch extend from the water's edge to the mountains. The course of the stream here is, generally speaking, to the southeast until it reaches a spur of a range of mountains trending to the southwest, where it turns sharply to the northeast and so continues until turned to the eastward again by the range of mountains which form the northern boundary of the Kowak Valley.

When we reached the mountains on the south side of the valley and turned towards the northeast, the shores of the stream suddenly contracted from four hundred and fifty to two hundred yards, and the current increased from four to seven knots. We put on one hundred pounds of steam, and with the assistance of the Indians paddling their boats were barely able to stem the current. The shores on both sides were clothed with a dense growth of willow and small spruce, and were perfectly impassable, so that we could not resort to towing. Toward 4 o'clock the sun broke through the rain clouds for a short time, drying our wet clothing and camp outfit, which had been soaked continually for three days. Toward 10 o'clock we reached

a part of the river where it is divided into three parts, and from here on many islands were found. On an island which we reached about 11 p. m. we discovered two Indian women, with three children, awaiting the expected run of salmon. Their husbands were away in the mountains hunting deer, and the women and children had been subsisting for days on the young shoots of the willows growing near the river banks. We gave them a feast in the way of pemmican, hard bread, and tea, and when we finished by a present of a small quantity of tobacco their gratitude seemed to be beyond expression.

The skin boat was unloaded here and several weak places in her bottom repaired by the women. They also repaired the boots of the party while we were asleep. We observed with each day's advance a lowering of the temperature of the river water, caused no doubt by numbers of small tributary streams, fed by the melting snow and ice in the mountains. In this connection it may be of interest to note that many small streams flowing into the Kowak from the mountains, which are at the present time much lower in temperature than the river water, do not freeze during the winter on account of the fact that they are fed by springs whose temperature never gets sufficiently low to freeze. I could not help but think that these streams, some of which I found contained from two to two and a half fathoms water, would afford excellent facilities for laying up boats used by future explorers or traders on this river.

On July 10, after leaving a small supply of provisions with the Indian women, we pushed ahead up stream, and notwithstanding the fact that the launch was urged to her full capacity, the current became so strong as we advanced that but indifferent progress was made. A short while after leaving camp we came to a part of the river where it suddenly widens and forms a kind of lake, about half a mile in diameter. The water, separated into many small channels by sand and gravel bars, became quite shoal; but we managed to get the launch through by getting overboard and towing her over the worst parts. Whenever opportunity offered, towing along shore was resorted to, but on account of the prevailing high water the beaches were all submerged, leaving no place to walk along the banks. To add to our discomfort we were in constant danger of being swamped by floating trees, which we frequently encountered. Their progress was so rapid and yet so imperceptible that it required the utmost caution to avoid them. Probably in no way can the strength of the current be better understood than by watching the progress of one of these trees down stream. At first it appears as a mere speck on the surface of the river, seemingly quite stationary; then, as it reaches the influence of some eddy, its course is changed and it shoots directly across the stream until it brings up with a tremendous crash against the opposite bank. Here it will remain an obstacle to navigation until some future freshet tears its clinging roots from the shore and sends it tearing on its downward course again. Sometimes it happens that a large tree with roots filled with earth, and looking as if but recently fallen, will ground on some gravel bed in mid-stream. The top swings slowly down stream and the water pours in a cataract over the roots. In a moment the loose earth is washed away, the strong, pliant branches, borne down by the giant grasp of the river, bend and break; and when at last the tree shakes off this terrible grip and rises to the surface there remains only a whitened finger of vengeance, which points sadly at the murderer as he flees to the sea.

Now the river contracts its bed to one hundred and fifty yards in width and runs directly under the shadow of the mountains forming its northern boundary. The shores are rocky and the sides of the mountains are moss-covered to their tops. Forests of spruce, pine, and birch give to the scene an air of peaceful repose, more in accord with the character of a New England landscape than is generally looked for within the Arctic Zone.

The general trend of the mountains is still east and west, and the course of the river, although exceedingly tortuous, follows the same general direction. The mountains which bound the Kowak Valley on the south are about ten miles away at this point, and now begin to assume a more definite shape and direction. Their general direction being southwest and northeast, the two ranges rapidly converge, and at a point far ahead seem to almost join. To-day we passed two mouths of the E-yog-a-lok-tak, or Rocky River, and it is evidently a stream of some considerable size, as its course could be traced for a long distance to the northward, and its delta was two or three miles long. In this vicinity the country lying between the Kowak and Noätak

Rivers is very mountainous, and the natives assure me that there are large numbers of very deep lakes and small rivers.

Among the timber observed our attention has been attracted to large groves of the Balm of Gilead.

Many deserted winter villages were observed in this region, and now and then we catch sight of a tall pole, bearing a fluttering pennant of some gaily colored cloth, marking the grave of some departed brave.

The number of islands increased as we advanced, and the depth of water was greatly diminished by being divided into so many channels. We were compelled to take the largest channel in order to avoid getting ashore, an accident which we had by this time learned to dread. The moment the launch grounded we lost all control of her movements; she generally swung around broadside to the current and then lay over on her beam-ends. It often required two or three hours of the most fatiguing work, during which the whole party would be wet from head to foot in the icy water, to extricate her from this awkward position.

The Indians informed me that Lieutenant Stoney abandoned his launch much further down stream last year, but realizing the importance of keeping the party undivided as long as possible, I determined to push the launch as far as she could possibly go, trusting to future rains to get her down again.

Toward 9 p. m. we emerged from a densely wooded bend of the river into a reach trending to the southeast, and beheld a low range of mountains bearing south and about twenty miles distant. The sun had been obscured all day and the rain had fallen with a steady persistence which threatened either to reduce us to pulp or drive us mad. Now, however, the weather cleared, the rugged, storm-worn clouds rolled slowly away, and the sun burst forth, causing the somber landscape to blossom into life. On the mountains the moss lay in patches of red, brown, and gray, and below it the forests of spruce were turning from green to blue, from blue to purple, and soon would now be black. The river, which a moment before had seemed a turbid, muddy torrent, touched by the sunlight, became flame-like in its radiance, and, like a vast mirror framed with flowers, reflected the sun-kissed heights, and darkening glens with truthful impartiality. A dying dolphin assumes the colors of the rainbow; so dies a summer day in the land of the midnight sun.

At 6 a. m., July 11, we were again under way and struggling slowly ahead against the strong current. By 9 a. m. we reached a series of rocky bluffs running in on the river from the mountains on our left. Here the sun came out long enough for me to get an observation, and fixed the position approximately as latitude 66° 51′ N., longitude 156° 21′ W. The river here is about two hundred yards wide and filled with gravel beds in every direction. The shores are rocky and the undergrowth reaches the water's edge. The course of the stream was generally to the east-southeast by compass. Several times to-day we were compelled to haul the launch past stiff portions of the current, and we had long since stopped towing the skin boat, it being found more advantageous to allow the Indians to get it up as they saw fit. By 2 p. m. we came in sight of an exceedingly rugged range of mountains, forming a spur of the boundary range on our left, and hidden until then by the foot-hills along the river. I judged the height of these mountains to be twenty-five hundred to three thousand feet; but they seemed at first sight much higher on account of fierce precipitous formations.

We observed many fresh signs of bear, porcupine, and deer along the river banks, and the natives informed me that those animals were very plentiful in the mountains in this region. During the colder weather of the winter months the deer migrate farther to the northeast. About 4 p. m. the expedition reached a very narrow portion of the river, where the shores were composed of almost perpendicular masses of conglomerate rock, and the bed of the stream was strewn with huge bowlders, worn smooth and round by erosion.

The current at this point was tremendous, and it was only after about two hours' hard steaming, and with all hands pulling on the tow-line, that we got the launch through and into a somewhat easier portion of the river. A mile or two farther up stream and we reached another narrow bend, and here the rocks reached entirely across the stream, leaving only small openings, through which the water forced itself with terrible velocity. We stopped and made

a reconnaissance, and succeeded in finding a passage, through which the skin boat was first hauled up; then, dropping a line down to the launch, all of the party, with the exception of four who remained in the launch, clapped on to it and began to haul away as we dashed at the passage with 110 pounds of steam on the boiler. The passage was reached, the launch plunged her bows deep into the water, and the next moment would have been safely through, when the line broke with a twang, and she began slowly but surely to go astern. She struck a rock with a wheel and it stopped for a moment, and in that moment the strong current swept her broadside on to a huge round bowlder, and I thought she would be certainly lost. She went over on her beam-ends, there was a moment of suspense, and the next she was swept over by the water and went drifting down stream at the rate of ten miles per hour.

The Indians had abandoned their boat in the mean time and ran down below us to render any possible assistance, and we soon got a line which they threw us and hauled in alongside the shore to repair damages. Fortunately no serious injury was sustained, but we decided not to risk the launch again, especially as the Indians informed me that with each day's clear weather the river would go down very rapidly, and it would be impossible to get the launch *down* later, even if we succeeded in getting her *up* now.

We were at this time one day's journey from the highest point reached by the Stoney expedition in 1884, and after holding a consultation I decided to leave the launch here in charge of Mr. Townsend, who would use her as he thought best in making a collection of specimens of natural history, and push ahead with the Indians in the skin boat. Up to this time the expedition had been pushed ahead so rapidly that Mr. Townsend had had very little opportunity for prosecuting the work of making a collection, and at his suggestion I decided, as before stated, to leave him here with the launch. This necessitated the detention of Marsh and Lewis also with the launch, as Mr. Townsend would require their assistance in handling her.

We spent the remainder of the day in selecting such articles of camp outfit and supplies as were necessary for our trip, and loaded the skin boat preparatory to an early start next morning.

The morning of July 12 opened clear and bright, and, after leaving directions with Mr. Townsend in regard to dropping the launch down stream in case the water began to shoal, we bade good-bye to the launch and started on our way in the skin boat.

With the first signs of day on July 12 we started from the launch with the skin boat, which I named the *Pioneer*, and soon a bend of the river hid the remainder of the party from our sight. We had, for provisions to last twenty days, two boxes pemmican, one box tea, and thirty pounds of hard bread, and, notwithstanding the fact that we labored incessantly from fourteen to sixteen hours per day, there was never a time on the entire trip when we really suffered from hunger. Game was abundant, and the fish (also plentiful and easily caught) were delicious. Along the banks of the river berries grew in the greatest profusion, and our daily bill of fare was as varied as one could wish.

Soon after leaving the launch we entered a long reach of the river, almost choked with huge bowlders of conglomerate rock, and the current became so strong that it required the united efforts of the entire party to haul the skin boat through. The depth of water nowhere exceeded six feet, and the Indians informed me that the river was falling with each day's fine weather. The valley is not more than eight miles wide here, and the stream is rapidly affected by rains, which swell the mountain streams flowing into it. At the head of these rapids the river is again divided into several channel-ways, and I observed a river flowing in from the south. The Indian name is the Chok-way-chok, having reference to the rapid current. The junction of this stream with the Kowak is called the Pah, and the river itself has been mistakenly called by this name. This is the only river of any size flowing into the Kowak from the south, and the Indians inform me that at one time communication was had with the Ko-you-kuk by means of a short portage connecting its headwaters with a tributary of the latter stream, but latterly it has fallen into disuse and another and easier route pursued.

Our first day's work ended at 8 p. m., when, worn out by our long tramp, we camped for the night on a level tundra plain. Fortunately the mosquitoes were not troublesome, and soon we sat around a blazing fire, smoking very comfortably and on terms of perfect equality.

The width of the river during the day was from two hundred to two hundred and fifty yards. The shores were generally low, except where ridges crossed the stream, forming steep rocky banks. The bed of the stream is mostly gravel in this locality.

After a sound night's sleep on the soft moss of the tundra we got away at an early hour, so as to take advantage of the cool air of the morning. On fine days the thermometer ranges from seventy-five to eighty degrees in the shade. By noon we espied the smoke of an Indian encampment on an island ahead. With renewed efforts the Indians walked away, often up to their waists in the ice cold water, and in an hour we reached the island and found a collection of summer houses and some half-dozen miserably clad natives, waiting for the expected run of salmon.

They expressed no great surprise by their actions, but went about their work seemingly quite oblivious of our presence. After we landed, however, and made a few presents, their natural curiosity overcame all other scruples and all crowded around me, anxious for a good look at the white man. At this place I found a record left by Lieutenant Stoney, U. S. N., in 1884, giving an account of a lake visited by him and his party, bearing north and distant about eleven miles from the river. A small stream, which is a branch of the inlet to the lake, called Nud-re-wok by the natives, flows into the Kowak opposite the village. This was the highest point reached by Stoney in 1884. After taking a copy of this record, I replaced it where I found it, accompanied by a record of my visit.

The Indians at this place informed me that in five days we would reach the cataracts, where boat navigation ceases, and where it is customary to cache their boats and wait until snow falls to proceed farther into the interior.

In actual distance this village is about three-quarters of the distance from the mouth of the river to its headwaters. Between us and Lake Car-loog-ah-look-tah there lies a part of the river which the Indians informed me was impassable with boats.

At 6 o'clock, July 14, we started from the Indian village, soon after reaching a part of the river where the channel was free from rocks; but the shores along which we had to tow the boat were fringed with bowlders and it was tediously slow work to get the frail affair past them without tearing her to pieces. Paddling against the current was utterly impossible with a boat as large as ours, and when the nature of the banks is such that we cannot tow, the boat is propelled by "poling." The Indians stand well in the bow of the boat and with poles eight to ten feet long shove her step by step against the current. Considerable skill has to be shown in this kind of work, and often it happens that a breaking pole or careless movement of one of the party will be the means of losing all control of the boat. At such times all hands plunge overboard the moment the boat drifts in shoal water and hold her head up stream until a fresh start can be made.

With the continued fine weather of the last few days the river subsided greatly and became beautifully clear. Fish can be seen twenty or thirty yards distant as they lie in the bottom of deep pools. The current averaged eight knots in this portion of the river. Many islands were passed during this and the succeeding day, and the shores of the river were in some places two miles apart. The mountains here run almost parallel, nearly northeast and southwest, and are from two thousand to three thousand feet high. Among the timber the birch was observed to be more conspicuous and of larger growth than farther down stream. Many Indian houses were seen in this vicinity, but no natives, as they are either in the mountains hunting deer or at the fishing villages. A delicious trout is found in the small tributary streams which is not seen elsewhere on the river. Following is a description:

Back dusky greenish, shading to lilac. Sides lilac, rosy spotted. Under parts white. Dorsal fin and tail dusky gray; others rosy. Native name, Ar-ko-luk-puk.

This fish and the grayling, which is abundant everywhere above the rapids, take the hook readily.

With the subsiding of the water from the gravel beaches good walking was afforded the party and the progress of the expedition was in consequence much more rapid. The temperature of the air increased as we advanced until the thermometer registered as high as ninety-six

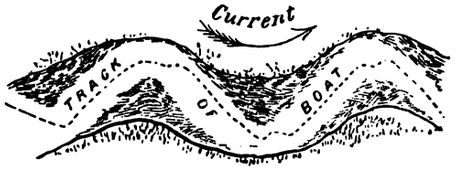
GAME IN THE ARCTIC.

EMPEROR GEESE.

degrees in the shade and seldom fell below eighty-eight degrees during the day, while that of the water ranged from thirty-six to forty-two degrees.

I never saw men work more faithfully than did these natives. I left the entire management of the party to Tah-tah-rok and it was seldom he failed to get less than fourteen hours' work out of them. While with the launch I got into several bad scrapes by following the advice of the Indians, who never seemed to realize that the launch could not be handled as easily as one of their own boats; but it is really marvelous what judgment and skill are shown by them in handling the skin boat, and I am convinced that they accomplished more than twice as much as would have been accomplished by less experienced men in this peculiar style of navigation.

The character of the river changes very little as we slowly advance. Low green shores, are fringed by a gravel beach which gradually widens as we approach a bend until it forms a spit extending almost across the stream, then narrows again until it disappears entirely, and we have to cross the river to get a place to walk again. A diagram will probably better show the formation of the beaches:



When it becomes necessary to cross the river the boat is hauled alongside the bank, and the Indians carefully shake all the sand from their feet and step into her. They grasp their paddles, take a quick look down stream to note the position of any rocks, and with a short cry of preparation shove off. In a moment the strong current strikes the light boat and bears her off like a leaf. The paddles, descending in perfect unison and with savage earnestness, send the water away in circling eddies astern. It is quick, sharp work, and although the river was seldom more than one hundred yards wide at this point, we were often carried twice that distance down stream before reaching the opposite bank. When the water is sufficiently shoal, as frequently happens during this part of the journey, the paddles are thrown aside and poling is resorted to. In either case the Indians stand well forward and so bring the boat down by the head, as in this way they can hold her head in any direction with greater ease than if she were on an even keel.

Toward 4 o'clock we passed the junction of the Kowak with a river flowing in from the north, called by the natives Arko-sher-wak, or Beaver River. The mouth of this stream was about seventy-five yards wide, and there were from five to seven feet of water nearly all the way across. This forms the outlet to Lake Mene-kok-o-shah of the natives, and is one of the principal feeders of the Kowak. At this point the course of the Kowak took us more towards the south and neared the mountains forming the watershed between it and the Ko-you-kuk River, and the topography of the country would indicate that somewhere in this vicinity the courses of the two streams are nearly parallel and the distance between them not over sixty miles.

Game was found in the greatest abundance in this locality. At nearly every bend of the river, and especially where small willow islands were seen, we came upon large flocks of half-grown geese, whose awkward efforts to escape were ludicrous in the extreme. Sometimes we surprised a flock in mid-stream, and they would attempt to evade us by diving. Being as yet not fully fledged, this was not always successful, and they would only be able to put their heads under water, and in this position would fall easy victims to the Indians.

During the day (July 15) we passed many small tributary streams flowing into the Kowak, and the natives assured me that the valley was full of many small lakes, from which these streams flowed.

The shores of the stream are generally low in this region, and the heavy timber is on the sides of the mountains, and only approaches the river where ridges run in on the stream from the foothills. We experienced some difficulty in finding suitable camping places on account of

the ever-present willow thickets, which here constituted almost entirely the vegetation along the banks.

On July 16 we passed the Ung-ee-let-ar-geeak River of the natives, which resembled very much in size and volume the Arko-sher-wak already mentioned. Like the latter river, it flows in from the north, and is the outlet of Lake Nor-to-rok-tee, which is the second lake in point of size of the four large lakes forming the sources of the Kowak.

The weather continued fair and intensely hot. The mosquitoes were simply terrific, and our lives were a burden to us altogether until we emerged from the low country and reached a portion of the river inclosed by high bluff banks. At 6.30 the Indians stopped as if at a signal, and Tah-tah-rok called my attention to a low rumbling noise ahead. I thought at first it was thunder, but its steady sound, and the fact that thunder is seldom heard in these latitudes, convinced me that it was falling water. We pushed ahead, and my feelings can scarcely be imagined when, at 8 o'clock, we rounded a high, rocky bluff and came suddenly in sight of a seething mass of white water bursting its way through a gorge composed of perpendicular masses of slaty rock two hundred to three hundred feet high, surmounted by a forest of spruce and birch. The channel was completely choked with sharp-pointed rocks, past which the water flew with frightful velocity, breaking itself into mimic cascades of foam and spray.

The Indians, as if sharing in my pleasure, set up a wild chant which echoed along the steep banks, and caused hundreds of gulls nesting in the crevices of the rocks to leave their perches and with loud discordant cries to circle round our heads.

The head of boat navigation had been reached, just twelve days from the mouth of the river.

Selecting a high dry spot on the bank just below the gorge, we went into camp, and soon my party, worn out with excitement and hard work, fell into a deep sleep.

The next day we spent in various ways. The Indians were mending their much-worn boots, while I, accompanied by Tah-tah-rok, made a reconnaissance of the gorge, with a view of ascertaining the possibility of getting our boat through. I was satisfied that it would be impossible to walk to the head of the river and carry my instruments and necessary articles of camp outfit, and my only hope of reaching Lake Car-loog-ah-look-tah was to get the boat past these rapids. We examined a portage formerly used by the natives to get past the cataract; but it was so overgrown with willows as to make it impassable even if we had been able to carry a boat as large as ours so far as this route necessitated. We then returned to the banks of the gorge and walked along carefully examining the rapids, which were about a mile long. While I sat on the high banks watching the foaming torrent below I suddenly observed a tree floating down the gorge. Sometimes borne along in the force of the current, and again held almost stationary in the eddies of the pools, it gradually neared the rock-choked entrance of the gorge. I followed its course with the interest born of a sudden resolve. Tah-tah-rok's quick mind was not slow to grasp the situation, for when the tree reached the cataract and lodged between two rocks he simply smiled and said, "Good."

My mind was now made up as to the manner in which we must get the boat above the gorge: I would divide the party, sending Tah-tah-rok and two men above the rapids to build a raft of small trees, which they would set adrift and float down to us. With these trees a temporary bridge could be constructed over the rocks and we would be thus enabled to haul the boat through. Tah-tah-rok understood readily the plan I proposed, and we returned to camp, where he made my wishes known to the rest of the party, and two of them immediately set out through the woods toward the head of the gorge. It was then late in the afternoon, and as nothing further could be done in the way of advance until we had the trees, I set the remainder of the party at work arranging for an early start the next morning. Our tow-line had become so much worn that any sudden strain would be liable to break it, and I cut the roping off the tent, which was quite new, and from it made a line we could depend upon. Everything which was not absolutely necessary was cached here, and the boat when loaded drew only four inches.

After a sound night's sleep, we broke camp early on the morning of July 19, and with the lightly loaded boat crossed the river and stopped at the entrance to the gorge.

Here the banks were perpendicular masses of slaty rock, in the crevices of which, near the

HEAD OF BOAT NAVIGATION, KOWAK RIVER, ALASKA.

top, a dense growth of birch and willow had sprung up. The bed of the stream was completely choked with rocks of slate formation, broken into a thousand irregularities by frost and ice. So sharp and jagged were these projections that the slightest contact with the skin boat would result in a hole being punched through her sides.

We had not long to wait for Tah-tah-rok, for hardly had we secured the boat in a protected pool and climbed up on a rock when we heard him and his two companions shouting in the gorge at no great distance from us, and almost immediately they came in sight around a bend, scrambling along the face of the rocky shores and holding on to a raft of small logs. When they reached the head of the cataract and further progress along the banks was impossible, the raft was hauled ashore and the logs floated down to us one by one. We succeeded in catching a majority of them and made a kind of ways upon the rocks, over which we hauled the boat. In order to do this we were obliged to unload the boat and transfer the contents to a safe place up stream by means of a temporary bridge from rock to rock in the rapids. In this manner, step by step, we worked our way slowly upwards, and had nearly reached a place where we could load the boat and proceed as usual, when an accident occurred which nearly proved fatal.

I had returned to the boat after a trip up to the spot where we had deposited our outfit, and was waiting for the rest of the party to come up, when I heard above the roar of the cataract a sudden cry of distress, and a moment afterward saw Tah-tah-rok struggling frantically in the water. As he swept past the rock upon which I was standing one of the party who had run down and joined me assisted me in lifting one of the trees we were using, and together we threw it toward Tah-tah-rok, who fortunately caught it, and a moment afterward it swung around and jammed in between two rocks a little farther down stream. We hastened to his assistance, and the whole party, coming up now, hauled him out of his dangerous position. Although but a few moments in the water, the poor fellow's hands and arms were cut in a dozen places by the sharp rocks, and he was so much exhausted by his struggles that I decided to stop and make a cup of hot tea before proceeding any farther. This we did, and after bandaging up his hands the boat was hauled up and loaded again, and we proceeded on our way.

The gorge was about a mile long, with banks composed of almost perpendicular masses of conglomerate rocks, varied now and then by steep sloping bluffs, moss-covered and overgrown with willow and birch trees. The river was here not over thirty yards wide, and, as might be expected, the current tore through with tremendous force. Along the base of the cliffs detached and broken bowlders afforded a precarious footing, over which we scrambled as best we might. It was often necessary to hold the boat alongside one rock and allow the party to go as far up as the length of the tow-line would allow and then sheer her out into the middle of the stream, in order to round some particularly bad point, the party in the mean time having secured a firm foothold on another rock farther up stream. Fortunately our tow-line proved adequate to endure the strain, and we at last emerged from the gorge and gazed once more on low shores, clothed with the usual willow thickets, with occasional clumps of spruce and birch trees.

All day we advanced rapidly, having a good beach to walk upon and finding comparatively little current to contend with. The temperature of the water was observably lower, and it seemed much colder on account of the heat of the sun. With the thermometer standing steadily at ninety-four degrees in the shade, and with no time to rest, one could ring the changes on a popular song and sing "an *explorer's* lot is not a happy one" with great feeling.

Just before camping for the night we passed through a reach of the river almost completely filled with rocks, and the boat suffered much by coming in contact with them. The banks were composed of a loose red sandstone, which crumbled at the slightest touch, and the water was tinged a deep brownish red by the constant dropping of portions of the bank into the river. Distinct water marks could be seen high up the banks, showing that at times the river must rise very high.

From the first gorge the course of the river is very nearly north. The bends are less

abrupt, and at 8 p. m., when we camped, the Indians pointed out to me the peaks of the mountains around Lake Cur-loog-ah-look-tah, which lies at the head of the river.

At our noon halt a lighted match was carelessly thrown down on the dry moss of the tundra, and shortly after leaving we saw it had set fire to the inflammable stuff. When we stopped to camp at night I climbed a neighboring hill and saw that the fire had spread until it covered acres and acres of ground. Nowhere in the world probably will forest fires spread so quickly as here, and I felt considerable anxiety to know where this conflagration would end. Fortunately, however, there was no wind to carry the sparks, and by 10 p. m. the fire had burned itself to water in all directions, and only a dense cloud of smoke remained to tell the story of so much havoc made by a little careless act. When the fact that explorers and others must depend almost wholly on the country for food is taken into consideration, the importance of being careful not to set fire to one's larder will be apparent, and ever after that I never left a camp until every spark of fire had been extinguished.

Next morning when we got under way the wind was from the north, and a pelting rainstorm beat in our faces. By 11 o'clock we passed from the low country, and were once more shut in by high abrupt banks. Here and there rugged masses of slaty rock, fifty to seventy-five feet high, broken into many curious forms by frost, projected into the river. The river at this point was not over twenty-five yards wide, but the current was not nearly so strong as in the lower gorge. The bluffs were bare of vegetation, except in spots where a sheltered ledge gave a chance for the bright-colored moss to grow. Thousands of mud nests made by the swallow were observed as we walked along the rocky banks, and sometimes as we rounded a projecting ledge a perfect storm of sharp querulous cries would greet us as these graceful little birds flew excitedly in and out of their curious little homes.

This gorge was about two and one-half miles long, and its general direction was east and west through a ridge running back to the mountains to the north of the river. Toward noon we passed out from between the rocky shores of the gorge into a low country, bounded on all sides by mountains. At 3 o'clock we passed through what was once a lake, but the strong current of the river had broken through the banks, and now it is simply an enlargement of the river, with a shoal in the center, which will doubtless become an island in time, and the identity of the lake will be lost.

Our progress was from this point exceedingly slow. The water shoaled so rapidly and there were so many gravel beds in the river that we were compelled to wade in the water and partly push and partly pull our boat most of the time. The *Pioneer* had become by this time so worn by constant hard usage that the utmost care had to be taken not to let her strike a rock or drag heavily over the shoal places.

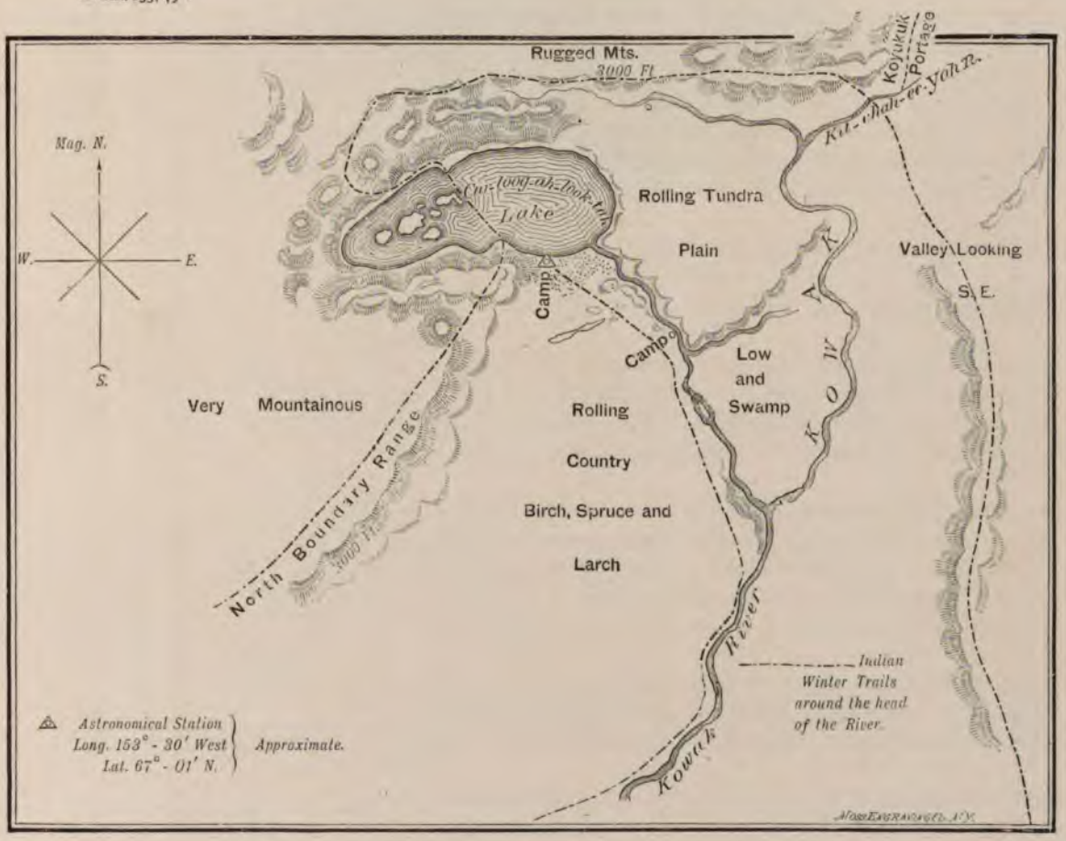
On July 21 the day became clear and bright, and after getting observations for longitude and variations of the compass, we broke camp and began our day's work. Soon the river began to shoal very rapidly, there being in some places not more than a foot of water anywhere. The width of the stream was from one hundred to one hundred and twenty-five yards, and the shores low, backed on both sides by mountains. The northern range still preserved its northeast direction, and at a point not far ahead seemed to terminate in a collection of rugged peaks.

Nearer the river banks on our left there were several remarkable looking mountains, densely wooded from base to summit. These latter were not over fifteen hundred feet high, but being entirely covered with timber, form a distinguishing feature of the landscape in this locality.

During the afternoon we reached the junction of the Kowak with a stream flowing from the north, and the Indians informed me that this was the outlet of Lake Car-loog-ah-look-tah. The mouth of the stream was sixty yards wide and contained from four to six feet of water, being somewhat wider and much deeper than the main stream at this point. We entered this tributary and pushed ahead until we reached a point where the river is obstructed by rapids, and I stopped to reconnoiter. Opposite to us, on the right of the stream (ascending), the banks were composed of high conical sand bluffs, along the sides of which and in the intervening hol-

LAKE CAR-LOOG-AH-LOOK-TAH.

H. Ex. 153, 49 1


Rugged Mts.
3000 Ft.
Koyukuk Portage
Kit-chat-ee-Yah R.
Mag. N.
W.
E.
S.
Chi-loog-ah-Look-ah Lake
Rolling Tundra
Plain
Valley Looking
S. E.
Camp
Camp
Low
and
Swamp
K O W A K R.
Very Mountainous
Rolling
Country
Birch, Spruce and
Larch
North Boundary Range
3000 Ft.
Kowuk River
Indian
Winter Trails
around the head
of the River.
Astronomical Station
Long. 153° - 30' West
Lat. 67° - 01' N.
Approximate.

lows was a dense growth of birch, spruce, and willow, the latter extending to the water's edge and forming an almost impenetrable thicket. We climbed this bank and reached a high rolling tundra plain stretching away to the northward to the foot of a rugged range of mountains which completely bounded the horizon in that direction. On the left the course of the stream we had just left could be traced by a belt of dark green timber, contrasting strongly with the light brown of the tundra moss, and ended at the foot of the mountains, about six miles distant. On the right the other branch of the Kowak could be seen winding off toward the mountains in the southeast, and then turning to the north again it was lost to sight behind the rolling hills of the plain ahead.

The Indians informed me that the lake could be seen from a slight elevation of the plain a short distance ahead, and we struck out across the tundra at once, and in a short time climbed up the sides of the hill and looked away toward the north. Four or five miles away, and almost completely surrounded by mountains from twenty-five hundred to three thousand feet high, the blue sparkling waters of the long-sought lake burst upon my view. The sensations of pleasure and triumph which took possession of me as I gazed upon its waters, now for the first time seen by a white man, amply repaid me for the long, tedious journey. As the last rays of the setting sun gilded the rugged peaks and the shadows of approaching night crept silently upward, we turned back toward our boat, and the Indians set up a wild chanting "Hung-hi-hung-ay" of joy.

We camped on a level place at the foot of the rapids and hauled the boat out to get thoroughly dry while we remained in the vicinity of the lake.

The distance traversed from the mouth of the river to this point was roughly estimated at five hundred and twenty-five miles.

Early next morning we left our camp and, taking with us our blankets and my instruments, we walked along the banks of the river toward the lake. With a good boat it would be easy to get her through the rapids, but ours was in such a dilapidated condition that I did not think it advisable to risk the chance of losing her by dragging her over any more rocks than were absolutely necessary.

We reached Lake Car-loog-ah-look-tah about two and a half hours after leaving camp. The walking was for the most part good, being over the dry moss of the rolling plain. In the ravines we struck small thickets of willow, but by making circuits we were enabled to avoid them. When we reached the lake we made a temporary camp on the beach at the foot of the mountain not far from the outlet, and I began at once the work of taking observations, photographing, sketching, &c.

Indian reports had led me to believe that Lake Car-loog-ah-look-tah was much larger than it really is. It is probably no more than eight miles long by three miles wide. Owing to its peculiar shape and the limited means at my command, very exact measurements were not obtained.

A diagram of the lake and immediate vicinity may be of service in understanding the fol lowing brief description:

Along the southern side, extending from the spot marked △ on the diagram, extending to the eastward around the north shore, there was found a narrow strip of beach, composed of white sand and variously colored pebbles. I attempted to walk around toward the west end of the lake, but found it impossible on account of the dense growth of willows which extended to the water's edge in this direction. With Tah-tah-rok and one other Indian I ascended the mountains which bordered the southern side, and from this point obtained a magnificent view of the entire lake and country in every direction.

All the northern coniferæ spread the deep green of their branches on the mountain slopes, and the larch, the birch, and willow were massed in clusters of deep foliage, through which the waters of the lake sparkled like a jewel.

The country to the northeast, north, and west was nothing but a series of short, detached, and rugged mountain ranges and isolated peaks, some of which were still snow-covered. On the south, west, and north sides of the lake the mountains were at the water's edge. In some

places, especially on the south side, the sides of the mountains adjacent to the lake had broken down, leaving bare perpendicular cliffs of dark slaty rock one thousand feet high, while on the other side the thick moss grew almost to the summits. At a height of eighteen hundred to two thousand feet the ravines were morasses, through which we had to wade, up to our waists in water and thick grass, to reach the top. At the east end of the lake the country was low, rolling tundra land, through which the river flowed to the southwest.

Five islands were crowded together in the west end of the lake, and were covered with spruce and willow trees.

Our point of observation was about half way down the lake on the south side. Here the cliffs were almost perpendicular masses of granite, broken into many peculiar forms by frost. Upon one of these cliffs I carved my name and the date of the arrival of the party at this point.

Opposite, a sand-spit projected into the lake from the north shore. With this single exception, the beach on that side is an unbroken line of white sand, extending from the head to the foot of the lake. On the south side two projecting points divide the sheet of water into three almost equal portions.

From our high position we could see that the lake contained no shoal places, except at the mouth of the outlet. The depth of water must be very great, as we could not get bottom sounding with a forty-fathom line.

When hunting around this lake during the winter the Indians cross to the north shore at the point where the long sand-spit projects into the water. A short walk along the beach to the westward brings them to a place where the ascent of the mountains can be made, and they reach the ridge along which they travel in order to get around the head of the river. In this vicinity the deer are said to congregate in great numbers, and the dry river-bed, filled with snow, affords a natural and easy means of capturing them. The exact spot where all signs of the river end was pointed out to me by the Indian, and bore northwest distant about fifteen miles. Between us and this place, however, lay the lake, and beyond it the mountains, which would be utterly impassable situated as we were.

The Indian name Car-loog-ah-look-tah signifies Big Fish Lake, and has reference to the immense fish which, according to Indian tradition, were once found in this lake. Tales are told of canoes and venturesome hunters being bolted by these monsters, and one of my party baited a hook, made of the antlers of a reindeer, with a goose, and attaching our tow-line he gravely threw it far out into the deep water, and making the shore end of this novel fishing-line fast to a stout tree he sat down and waited for some unwary fish to bite. Whether the appetites of the monsters had been dulled by a previous feast of an entire deer (or maybe a chance hunter), or whether, as I suspect, the size of the fish has been somewhat exaggerated by mendacious historians, is a question which future inquiry must settle, for, after remaining in the water all day and night, the tempting bait was hauled out and found not to have been molested. Fishing prosecuted on a small scale, however, was eminently successful, and were not this report intended as a plain statement of facts coming under my observation, I would hardly dare state what the size of some of the trout we captured was found to be, for fear of being suspected of exaggeration. By actual measurement, however, I found trout here from three to three and a half feet in length, and I saw in the clear water specimens much larger than the ones we were enabled to procure. Having no other means at hand, we captured the fish by firing a rifle shot directly under them, and so were enabled to procure only those which approached very close to the shore. The common salmon, trout, and other varieties seen in the river were observed here also; but the large trout, the natives inform me, never leave the lake.

July 23 opened clear and bright, and I spent the entire day in getting a set of observations for determining the longitude, latitude, and variations of the compass at this point. Equal altitude sights were also taken as a check on the chronometers.

Apropos of the chronometer, it may be well to suggest the desirability of using a good pocket-chronometer on expeditions of this character, instead of a regular ship's chronometer. In a country where walking is attended with such difficulties, the chronometer formed the most serious obstacle to rapid movements. Indeed, struggling through willow-thickets, wading

morasses, and clambering along the crumbling precipitous mountain ridges, and at the same time holding a ship's chronometer with sufficient care to insure its accuracy, would be simply impossible.

Having completed the reconnaissance of the lake, we returned to our boat, and next morning set out for the smaller branch of the river by means of a shallow stream which leads from the lake outlet almost across the low swampy land which lies between this river and the Kowak. We made a short portage and reached the Kowak, up which we began to shove the boat. The river here was not over fifty yards wide and scarcely more than one foot deep anywhere. All day we pushed the boat up the shoal stream past the mouth of a small stream called the Kit-chah-ee-yak, and did not rest until the lightened boat, drawing five inches, would no longer float.

The river was now nothing but a shallow brawling brook, tumbling down from between the rugged mountains lying on the north side of the lake. From this point we could see the mountains running in an unbroken line from the vicinity of the head of Lake Car-loog-ah-look-tah in an easterly direction, bounding the horizon, and showing no break through which a river could possibly flow. The Indians pointed out to me the ridge along which they travel during the winter when approaching the lake from the south. The sides of the mountains are almost perpendicular masses of gray rugged rocks. Toward the southeast they dip lower and finally run off into rolling foothills. It is from there the natives approach the ridge.

The Kit-chah-ee-yak River, which flows into the Kowak near the foot of Lake Car-loog-ah-look-tah, drains a valley in the southeast which lies at right angles to the Kowak Valley, and is the most noticeable, in fact the only, break in the mountain-bounded horizon. The natives informed me that by crossing the ridge which forms the northern boundary of the Kit-chah-ee-yak one day's journey in winter brings them to the Ah-lash-ok River, which is a tributary of the Koyoukuk. This is the route taken by the Kowak Indians when they wish to meet those of the Koyoukuk in order to trade.

After spending the day in looking around in the vicinity, I prepared to go into camp, intending to make an early start down stream the next day. The wind was from the south and the clouds were beginning to gather threateningly along the tops of the mountains. The Indians advised me to get back as quickly as possible, as a very short rain would be sufficient to swell the river so much as to make the gorge impassable. Accordingly we started at once, and after getting the boat down as far as the junction of the Kowak with the Kit-chah-ee-yak, we got in her and the descent of the river began in earnest. By nightfall we had shot the rapids below the lake successfully, but not without injury. Half way through the cañon the boat "took a sheer" and started off across stream, utterly beyond control. She crashed into a flat rock in the bank, breaking her rail and tearing a hole in her side a foot long. We were compelled to jump overboard and lift her up on the bank and repair damages.

This accident caused me to think more seriously of the dangerous places through which we would be compelled to take the boat before reaching the launch, and as she might yet be our only means of reaching the coast (in the event of the loss of the launch), I resolved to stop and arrange some means of protecting her rotting sides and bottom from the rocks and gravel beds which we found it impossible to avoid running over. Fortunately we had with us an ax and a small brace-and-bit, and with these and a few nails the boat was made proof against ordinary encounters with rocks or the bottom, as follows:

A false keel was made of a straight spruce tree, one of the roots being left to form the stem. This was easily fitted, as the boat's keel was originally constructed in the same manner. Holes six inches apart were bored transversely through the false keel, and then it was securely fastened on the bottom of the boat. Willow wands were then fitted into the holes in the keel piece and brought up around the outside, and the ends secured to the rail. Smaller branches of willow were then woven with the others, basket fashion, forming a complete covering for the boat's bottom and sides below the water-line. Although this made the boat much heavier and harder to handle, it effectually protected her while shooting the rapids.

July 25 was ushered in by a terrific rain-storm, and we found ourselves half way between the two rocky gorges. If we were to get through the lower one no time must be lost; so, in

the face of the storm we set out early in the morning. Between these gorges, as has been already stated, the river widens and the current decreases, so that with a gale of wind ahead we found it almost as hard work to descend as to ascend the stream. However, we soon got beyond this low stretch of country and by 2 o'clock reached the upper end of the lower cañon. The river now was rising rapidly, and I observed with apprehension that many of the rocky points which had afforded us a foothold in coming up were now overflowed by the muddy torrent. We stopped at the first convenient ledge and all of the party, with the exception of Tah-tah-rok and myself, got out of the boat. The tow-line was then secured to the stern of the boat and the Indians on shore veered away or held on, as directed by Tah-tah-rok. In this way we slowly worked our way through the gorge until within two hundred yards of clear water. This is the worst part of the river and it really seemed as if we would be compelled at the last moment to abandon the boat. She was unloaded and all the instruments placed in a safe spot near by. We then all clapped on to the tow-line and let her go, carefully guiding her past half-submerged rocks and through narrow passages where the water was deepest, until at last she rested safely in a quiet pool at the foot of the cascade. The rain now came down in streams, and amid the discordant cries of hundreds of gulls, the roar of the rapidly rising river, and the howling of the wind through the gorge, we hurried back over the rocks (parts of our bridge not yet having swept away), and brought the instruments down to the boat, and at 5 o'clock, having safely accomplished what had never been done before, we camped at our old place, finding our cache undisturbed.

A large fire was built, and in spite of the fact that the storm was now at its height, we were so completely sheltered by the thick spruce trees that we were soon dry again, and having eaten a hearty meal we all lay down on the soft moss, and rolling up in our rubber blankets, slept as soundly as if surrounded by every convenience of civilization.

The storm lasted till midnight, when it ceased as suddenly as it had begun, and when morning broke the air was warm and pleasant and the sun rose clear and bright in a sky that was free from clouds. I spent the day in obtaining a set of observations for determining the latitude, longitude, and variation of the compass, and the Indians, under the direction of Tah-tah-rok, removed the willow "chafing gear" we had put on the boat, as it would not be necessary to keep it on any longer.

At 7 o'clock of July 27 we broke camp and started on our way down stream. Soon we entered the island system of the river, and, choosing passages not explored in coming up, we shot past hundreds of small thickly-wooded islets at the rate of ten miles per hour. Once in attempting to pass between two small islands we found our way blocked by a tree which had fallen entirely across the stream, and we were compelled to turn back and proceed by another channel. These interruptions occurred frequently while passing through this portion of the river, but our progress was very rapid notwithstanding.

Toward 10 o'clock a brisk wind from the west sprang up, and soon increased to a moderate gale, accompanied by a heavy rain, and being directly in our faces was exceedingly disagreeable. At noon the sun came out, and I got an observation. Toward 8 p. m. we reached the Indian village where Stoney turned back in 1884, and were about to camp, when a note was handed me from Marsh, dated July 17, and informing me that in attempting to get the launch farther down stream she had gone ashore in the rapids, and at the time of writing there seemed no way of saving her. I determined to keep straight on to the launch without delay, and so, after partaking of a hastily-prepared supper of fish and tea, we bade our Indian friends good-bye and started down stream. Soon a bend in the river hid the fires of the village from our sight. The murmuring of the current as it swept along the rocky shores drowned the voices of the children at play. The howling of the dogs died away in the distance, and the wind and rain having ceased a strange silence fell upon us all.

There was no need to paddle now. The swift current bore the *Pioneer* along at the rate of eight to ten miles per hour. Through narrow passages and deep pools we rushed. Now past low banks, with the darkening mountains away off across the purple tundra plains; then shut in by high rocky shores topped by clustering spruce and birch, whose tops stood out like needle-points against the star-lit sky. Now the river is once more a single stream, with an

LITTLE SAVAGE.

GRANDMOTHER.

occasional island in the bends. The soft darkness fell like a veil upon the river, and when the moon rose it cast queer shadows along the banks. On, on, at break-neck speed, past densely wooded steeps and rocky bluffs, past mossy banks filled with flowers, and low plains covered by lagoons—on to the launch.

The dead spruce stood up grim and white in the semi-darkness, and in the silence of the night seemed like a company of shrouded ghosts gliding swiftly up stream. Once a white owl left his perch and swooped down within a foot of our heads, and then with a flap of his wings disappeared in the darkness. By 11 o'clock we reached the long reach filled with rocks just above the place where we had parted company with the launch. The Indians stood forward with their poles, and Tah-tah-rok and I sat aft with paddles to steer the boat through, for I determined to shoot the rapids rather than lose time in dropping her down. With a rush and a roar we plunged past huge bowlders fringed with foam, so close sometimes as to enable us to touch them with our hands, and then over jagged rocks lying beneath the surface. Sometimes the men forward would utter a sharp, short cry, and plunge their poles overboard, and, in spite of the rushing current, bring the boat's head up stream, so as to avoid a dangerous rock; but with this exception not a word was spoken.

In ten minutes we cleared the rapids and came in sight of the spot where we had left the launch. A piece of white cloth fluttered gently from the top of a long pole on the bank, and stopping there I found a cache of provisions and several heavy articles of our camp outfit, with a note from Mr. Townsend, dated the 19th instant, saying that after two days' hard work, during which everything had to be taken out of the launch and carried through water nearly up to their necks to the shore, they had succeeded in floating her over the gravel bed upon which she had grounded, and that they were now encamped in a comparatively safe spot about ten miles below the cache. We put the things into the boat and proceeded.

Just below this point the river widens and many gravel beds obstruct its course. Here the launch grounded in attempting to go down, but our light boat shot straight down without difficulty, and at 11 o'clock we came in sight of the tents of our party and the launch safely tied up alongside the bank. We dropped down upon them very quietly and with a tremendous yell awoke them from their sleep and proclaimed our return.

I was glad to find all hands well, and Mr. Townsend assured me that many valuable specimens of the natural history of the country had been collected during my absence. At the camp I found some fresh bear meat, and in a short while we sat down to a most delicious supper of bear steak, hot biscuit, and coffee, which, considering the fact that we had traveled over one hundred miles without stopping to eat but twice, was found to be most acceptable.

So ends the voyage of the *Pioneer*.

On July 28 the entire party started for the coast. The river was rapidly falling, and I learned from a family of Indians who were encamped near us that if we delayed much the steam-launch could not be got down. This seemed to be extremely probable, for we had hardly gotten fairly started when the launch became unmanageable and ran out on a gravel bed. The current forced her completely over on her beam ends, and if Lewis had not promptly hauled the fires and blown off the steam serious consequences might have followed. As it was, we found it impossible to hold her head up stream by any ordinary means and so were compelled to fill four coal sacks with stones from on shore and plant this improvised "bower" some distance up stream with a line attached, by means of which we were enabled to get the launch into deep water again. By shortening up on this line and going back on the engine we slowly "clubbed" our way through the intricate passages and at 5 p. m. found ourselves where we could proceed in the usual manner.

At 8 o'clock we reached an Indian fishing village and camped. The fishing season was now at its height and we obtained some magnificent salmon from the natives. From this village, bearing northwest by compass, is a series of three lakes of which Car-le-ok-shuk is the nearest to the river and separated from it by a range of rugged mountains from three thousand to thirty-five hundred feet high. A small stream runs into the Kowak, by means of which the

vicinity of the lakes can be reached; but no direct communication by water exists, and I am inclined to think that if any outlet to these lakes exists, it flows northward into the Noätak. The country lying to the northward of these lakes is mountainous, and it is likely that many small lakes exist in this region. When traveling to the head of the river during the winter the route generally pursued is to the southern side of the Kowak, where the mountains are less precipitous and the trail less obstructed by thickets and timbered land. On the north side a few summer portages exist for journeying to the vicinity of Lake Car-loog-ah-look-tah; but as they are seldom used I could not obtain any definite information in regard to the character of the country through which they lay.

The next day (July 29) the river fell so rapidly that I decided to wait until it began to rise again before proceeding. The day was spent in getting a set of observations and in seeking information in general of the Indians.

At this village there were eight women, ten children, and only one man. The husbands of the women were away in the mountains hunting deer, and the solitary representative of the sterner sex, a decrepit old fellow, sixty or seventy years of age, seemed to have some difficulty in holding his own against such odds.

The fishing season being at its height, the women were busy all day and until it became too dark at night, hauling their seines. A large fire was kept up, in which round stones, two and a half to four inches in diameter, were heated red hot, and when a meal was desired they were thrown into a tub of water, rapidly raising its temperature to the boiling point. A half-dozen fish were then put in, and in a few moments the natives gathered round the fire, and after the woman who superintended the cooking had removed the fish from the tub and placed them in a large wooden tray, they fell to without ceremony and ate until the supply was exhausted. In a short while another haul of the seine would be made and another feast inaugurated, so that one sometimes wonders if it is possible to appease their appetites.

The Indians of my party took an active part in eating the fish after they had been cooked; but I never saw one assist in their capture by so much as helping the women shove their boats off the beach. They would squat lazily down on their haunches and look on with ludicrous impassiveness while the women loaded their boats with the seine or hauled it in heavily weighted with fish.

The children assist the women, and the scene when a big haul is made is picturesque in the extreme. A half dozen little naked savages, up to their waists in the water and struggling frantically with refractory salmon and white-fish, almost as large as themselves, was an event of frequent occurrence.

The fish which are not immediately eaten are cut open and the entrails removed, and are then hung up to dry on long poles placed horizontally on upright supports along the beach. The head is removed and the roe is dried separately. Fish are sometimes, though not commonly, buried without having been previously cleaned, and allowed to become putrid before eating. This form of diet is esteemed a luxury, but owing to the trouble of transporting it when traveling it is not so common as the dried fish. I attempted to eat some of the buried fish, but, in spite of the fact that I was very hungry at the time, I could not retain it on my stomach, and I am satisfied that a white man would starve before his stomach could be educuted up, or down, to this repulsive diet. In addition to the drying-poles, each fishing village contains a square house, ten or twelve feet high, made of piles and covered by small poles. When a sufficient number of fish have been dried on the poles, they are put in this house and thoroughly smoked, and are then ready for storing away for winter use.

The seines are cleverly made from the inside bark of the willow and range from thirty to sixty feet in length by four to six feet in width. Pieces of deer antlers are commonly used as sinkers for the seines. In many places along the river the banks are filled with a tough fibrous root, from which is manufactured a most admirable substitute for twine. Seines made of this material are accounted superior to any others, and from my experience with one which we had brought from the ship, I do not think a comparison with the native article would show that civilization had made any improvement in this direction, except perhaps in point of weight.

All day we had been anxiously watching the clouds which hung around the mountain peaks farther up the river with a hope of rain, and about 5 p. m. they gradually began moving along the tops of the mountains from east to west, steadily increasing in volume and rapidity of motion as the sun went down, until the whole northern sky was darkened and the atmosphere became sultry and oppressive. The situation of our camp, on the side of a woody bluff, gave us a magnificent view of the valley of the river and the mountains toward the east, and long before the coming rain reached us we could see the clustering spruce bend and darken on the hillsides, the willow thickets shiver in the valley, and the silver birch turn pale and tremble before the coming of the blast. And as we looked away off across the low green valley, with its hundreds of lagoons, which gleamed in the rays of the setting sun, the clouds seemed to mass themselves upon the heights and charge down into the valley, obliterating whole mountains and drowning the very light of day. The night and the storm came together, and for hours we lay in our tents and listened to the howling of the wind, the fierce beat of the rain, and the rapidly increasing murmur of the river as it swept past our camp.

When morning broke the storm was still raging and the river had risen almost a foot during the night. At 8 o'clock a short lull gave us an opportunity to break camp and proceed. At this point the river runs to the southwest, leaving the mountains on the north side, and gradually approaches the range in the south. Many sand and gravel spits make out from the shores and the course of the stream is very tortuous.

The width of the river in this part is from two hundred to two hundred and fifty yards, and the depth of water varies from six to eight feet. The current was now about five knots, but in the bends, where sand spits projected from the opposite shore and the channel became narrow, it increased so much that we were compelled to drop the launch through backwards by means of an anchor kept out up stream. Two of the Indians in small canoes were kept five hundred yards in advance, and by means of signals pointed out the best channel. At 3 p. m., having passed some very shoal places and arrived at a place where the river turns toward the south, I stopped and camped, hoping to get some observations.

Mr. Townsend and I climbed the mountains near the camp, and the storm having ceased, we had a fine view of the country. About five miles from the river we got upon a ridge overlooking the country to the northward and discovered a river of considerable size flowing into the Kowak, some distance below, from the northeast. The river range, although covered with moss and timber on the side nearer the river, was precipitous and rugged in the extreme on the other. Deep, abrupt cañons and gorges could be seen in every direction. When we reached the ridge, after climbing along densely wooded slopes and mossy plains, and first beheld the totally different country beyond, the effect was startling.

The tundra plains are filled with berries, and we have no difficulty in obtaining an abundance of salmon, blue, and wild raspberries, while in places, especially on high land, the wild currant was found of excellent quality. To these articles of diet may be added the wild onion, rhubarb, and parsnip, which formed an agreeable change from our daily rations. The Indians are very fond of the wild parsnip and adopt a shrewd plan for getting a supply without the trouble of collecting it. The field mouse is very common in this region, and before the winter sets in has constructed himself a house and filled it with the desirable root. Now, all the Indian has to do is (to use the words of my interpreter), "Look for mouse-house; bimeby see little hill; Injun dig up little hill; ketchum plenty root; very good!"

To be fully appreciated by the native gourmand it must be first boiled with fish or seal oil, and if molasses or sugar is obtainable it is sweetened by the addition of one or both of these ingredients. The wild parsnip is common along the rivers and in the low valleys of all Northern Alaska, and Myunka, the interpreter, who lives on the Yukon, informed me that its use as an article of diet is common on that river. Apropos of the native fondness for sugar, and in fact all saccharine substances, it is remarkable that they have never acquired the taste for salt. The river Indians do not eat salt with their food, and in fact object to it with manifest repugnance when forced to eat such articles as bacon, ham, &c., which are necessarily very salty.

At noon on July 31, after having rested at this village a day and a half, we left and pur-

sued our journey down stream. During the afternoon we passed and examined the mouths of the river which Mr. Townsend and I noticed flowing from the northeast while we were on the mountains. The river has two principal mouths, forming a delta about two miles long. They were about seventy-five yards wide and from six to ten feet deep. The native name is El-yog-o-lok-tok, or Rocky River. None of my party had ever ascended it, and no extended information, except that it flowed through a mountainous country, and its channel was filled with rocks, could be obtained.

At night, after passing many islands covered with spruce and willow, we reached the foot of the mountains bounding the Kowak Valley on the south. From this point the course of the river turns to the northward and westward toward the Jade Mountains, which can be seen lying dim and blue in the distance. As the position is an important one, being possibly the southern limit of the river's course, I stopped and camped in order to get a good set of observations.

The rain still came down in a steady, willful, persistent fashion which was most disheartening, and even the Indians, who generally seem to care as little for a wetting as a duck, looked washed out, faded, and disconsolate. The camp was pitched on a rocky beach at the base of a low bluff, but before morning the river rose four feet and drowned us out, and it was with considerable haste that the tents and impedimenta were bundled up the steep bank and placed beyond the reach of the flood. The top of the bluff was overgrown with moss and willow brush, and it was found to be impossible to pitch our tents. The mosquitoes have become impervious to rain, and after the party had finished exploring the bushes for a fit place to camp they returned to the river bank, each attended by a cloud of mosquitoes, which, if they did not make our lives happy, at least caused us to forget all other discomforts by their persistent and bloodthirsty attacks.

With the first streaks of dawn steam was got on the launch, and as soon as we could see well enough to pick out the channel we left our dismal camp and incontinently fled. Our tormentors followed us a short distance, but once out in the middle of the river, here about five hundred yards wide, the launch was urged ahead at full speed, and, aided by the strong current, we swept down past the flooded banks with frightful velocity, and the mosquitoes were left behind.

At sunrise we came in sight of a fishing village, and my three river Indians immediately recognized it as their home, which had been removed from the place where I had picked them up. We landed, and, finding a good place to camp, we soon had our tents pitched and fires built to dry our soaked clothing. The father of the Indians who accompanied me was on hand to meet us and I watched with some curiosity how he would meet his sons. I was surprised to see that he did not notice them, nor they him, by the slightest word or action. All of his remarks were addressed to Tah-tah-rok, and had relation to the weather, run of fish, &c.

After the camp had been pitched the Indians of my party and those from the village sat down round the fire and smoked silently for some time. At last one of my party began in a high key and very abruptly to give an account of our trip. He was interrupted from time to time by short ejaculations of surprise or approval, and as the narrative progressed these interruptions became more frequent until at its close the speaker ended quite as abruptly as he had begun, and, rising from his seat on the ground, walked slowly to the fishing village and went into his father's house.

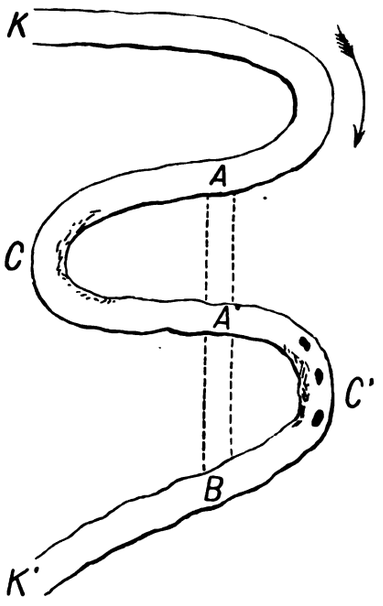
By a strange coincidence, our camp was situated on the very spot where, the year before, I had reached the Kowak by making a portage from an Indian village situated on the Um-ok-a-look-tok River. A short distance back of the river, on the south side, a series of lakes extended almost to the mountains bounding the valley in that direction. The conformation of the country and the position of these lakes with reference to each other plainly shows that at no distant day the channel of the river was there, and that in accordance with the principles of a meandering stream the swift current had gradually cut a new channel through the soft banks, and the old river bed soon resolved itself into a chain of shallow lakes. As this formation is a

WATERFALL, OUNALASKA.

PRIEST ROCK, OUNALASKA.

characteristic feature of the entire river where its course is unobstructed by mountains, it may be well to consult the diagram given below, in order to better understand its meaning.

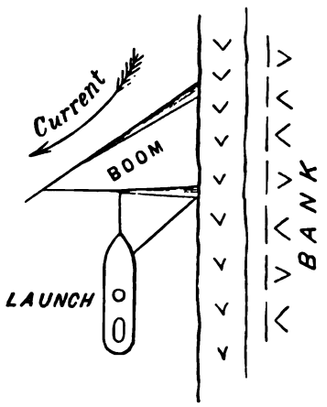
Let ↙ represent the direction of the current and K K the first channel. Then, by constant erosion, the banks at A and A′ will be gradually broken down; the débris gradually forms ⁂ shoals, or islands, in the stream, as at C and C′, and the distance from A to A″ and from A′ to B decreases until, no longer capable of withstanding the pressure, the banks give way, and a new channel is formed. The old channel at A, A′, and B is gradually filled up by sediment from the river, and the bends A, C, A′ and A′, C′, B become a system of lakes and lagoons.



From any high hill overlooking the valley of the Kowak this formation can be seen, and the number of lakes is only limited by the extent of the low level country through which the river has a chance to meander.

The rain continued to fall steadily, and the river rose rapidly for eight days, during which time we never moved, except as forced to do so by the rising water. I wanted to get a set of observations at this point, particularly as a check on my last year's work, and so we made ourselves as comfortable as possible under the circumstances.

With the rising of the river the current increased, and the launch was in danger of being torn from her position alongside the bank by floating drift-wood. In order to avert the accident two large trees were secured and the smaller ends lashed together at right angles. The butts were then made fast to the bank, the whole forming a right-angled triangle, under the base of which the launch was as safe as if in a dry dock.



The river rose on an average two feet per day. Many fish which were drying on poles arranged along the beach at the village were swept away; the Indians seeming to be too apathetic or improvident to take any precautions to save them. We moved our tents to a small hill a short distance from the river the third day we stopped here. The water had by this time overflowed the banks in low places and we were enabled to reach the lakes with small boats. Our time was occupied in gunning and fishing in the region, and many specimens were obtained.

Once Marsh encountered a land-otter while paddling across one of the small lagoons near dark. He had never seen one before and arrived in camp with his hair on end to inform us that he had just left a crocodile making a meal of his boat. We were soon in pursuit, but the shy animal got away.

In conversation with the Indians I learned that ten days portage in the winter time from the Kowak brought the traveler to the banks of a stream beyond the Noätak, and which flowed into the sea, where "*there was always ice.*" Near its headwaters there was a lake, which, like the lake at the head of the Kowak, became each year the rendezvous for hunting. When a herd of deer is discovered the hunters surround it and gradually frighten the deer so that they seek to escape by means of the lake. Into it they plunge, sometimes fifty at a time, and there fall easy victims to the hunters, who follow them in boats, and in order to save ammunition give the *coup de grace* with short spears.

At the mouth of the river they say the Indians gather for the purpose of trading with those from other parts of the country. The current is rapid and the river is shoal for a long

distance. Coal of a very good quality is found in cliffs along its banks, and in order to ascertain the native idea of good coal I asked my informant if it was as good as the coal found on the Kowak, and he said that the Kowak coal was "rocky" (*i. e.*, slaty), but that on the river described was very soft and black. The Indian name for this stream is Kar-n'yer-nok, and I have no hesitation in saying that it is the Colville of geographers.

On August 8 the rain ceased, and soon afterwards the river began to fall. By next day the banks of the stream became distinguishable, and soon the emptying lagoons formed miniature cascades, which tumbled down the broken banks and splashed noisily into the river. The clouds rolled away, the sun came out, and the dank, bedraggled foliage seemed to take fresh courage under the influence of its warming rays.

With the first appearance of the sun I got some observations, and at noon of August 9 I took the launch out and started back up the river, in order to get a set of observations at the place where our camp of August 1 had been drowned out. We found the river still high and the current proportionately stronger, but the launch, being unhampered by the skin boat, made good way against it, and by nightfall we reached a high sand bluff formed by a ridge running in from the mountains on the southern side of the river. This I considered a favorable spot for a set of observations, as it is where the river turns in its course toward the southwest and flows more toward the northward and west. In coming down the river the Jade Mountain here first comes in sight, and for a long distance forms a prominent feature of the landscape.

Mr. Townsend was soon busy with the birds, and succeeded in getting several new specimens for his collection. The weather cleared up cold, and during the night a light snow fell in the valley, and when morning dawned the tops of the mountains were covered with a white fleecy mantle which gave to the scene a wintry aspect and warned us that the short Arctic summer was drawing to a close.

The natives inform me that at this time the mountains at the head of the river are entirely covered by snow, and that in ten or twelve days ice will begin to form there. The river is never entirely frozen over, the strength of the current always keeping a small channel open. When the river opens in the spring and the accumulation of ice begins to move toward the sea the sight must be inexpressibly grand. The tremendous pressure tears asunder the banks, upheaves huge bowlders, and I have seen places where a large mass of ice had left the river bed and carved its way with irresistible force through a forest of spruce, leveling all obstructions and leaving in its path the ineffaceable evidence of appalling strength: prostrate trees, uprooted bushes, and trenches in the frozen earth six feet deep.

During the afternoon of August 11, having completed the work of obtaining astronomical observations at this point, we were about starting on our way down stream, when the yelling and shouting of the natives at the village just below us attracted our attention in that direction, and we beheld the United States steam-launch *Explorer*, with Lieut. George M. Stoney in command, coming slowly around the bend and standing over towards the site of our late camp. We were already under way and going down stream; but I stopped the launch and asked Lieutenant Stoney if I could be of any service to him. He requested me to stop long enough to enable him to make up his mail intended for the United States, which I did.

While lying alongside the *Explorer* the gauge-glass of our launch broke, and the prompt action of Lewis and Marsh alone prevented serious injury to the boiler. Mr. Zane, of the *Explorer*, offered me the facilities of the engineer's department to repair the damage; but as we had every facility at hand on the launch, it was not necessary to avail ourselves of his kindness further than to accept an extra gauge-glass in case of future accident.

After spending an hour very pleasantly together we parted company, Lieutenant Stoney's party proceeding up stream toward the place which he had selected for his winter headquarters, while the expedition under my command dropped leisurely down stream, stopping at intervals to get observations, to obtain specimens of the flowers and grasses, which grew in the utmost profusion along the shores, or to climb some hill where the character of the country could be best ascertained.

At night we reached a sand-spit in the river a short distance above the Not-mok-to-way-ok (river) and camped. The course of the Kowak is here about northwest, and trends more toward

JADE MOUNTAIN. KOWAK RIVER.

KOWAK RIVER, VICINITY OF JADE MOUNTAIN.

[illegible]

[illegible]

[illegible]

and on August 17 we reached this place on our downward journey. Mr. Townsend and I climbed to the top of the mountain and from this coign of vantage had an extended view. Far away to the westward the mountains around Selawik Lake could be seen, and between us and Hotham Inlet we could make out the delta of the Kowak with its hundreds of channel ways and lagoons, so close together that it seemed, as viewed from our position, that only a slight rise in the river would be necessary to change this system of islands, lagoons, and streams, into one vast sheet of water in shape like an equilateral triangle, having one of its angles at our feet, one at the lower end of Selawik Lake, and the remaining one at the north end of Hotham Inlet.

We observed on the summit of this mountain several piles of stones, and upon inquiry learned that they were placed there as landmarks by the natives to serve as guides while traveling during the winter. Huge bowlders of marble lay along the ridge, and seemed to have burst their way through the moss which covered the mountain in all other places.

During the next day we passed the junction of the Squirrel River with the Kowak. It flows in from the northeast, and beyond being one of the principal feeders of the large river it is not believed to be of any special importance. A short distance below this place is where coal was first discovered in the first exploration by me. Here the river is confined by a series of rocky bluffs, and forms what I have designated in former descriptions the first or lower rapids. We experienced some difficulty in getting through here, but, having obtained considerable knowledge of the channel by former struggles, we managed to get through without injury.

The coal is intimately mixed with a fine white clay, which renders its use for a small furnace almost impossible. However, it is my opinion, based on the experience of others, that this seam if worked would produce a good quality of coal.

I saw numerous specimens of extra good bituminous coal, which the Indians claim could be obtained easily, on some of the small tributaries of the Kowak, but I never succeeded, although I tried several times, to definitely locate the place where such coal could be obtained.

One of the most remarkable, in fact the only remarkable feature of the lower river, is the ice formation in the high black bluffs. The recent heavy rains had caused the river to rise to an unusual height, and I observed in many places where the erosion of the flood had exposed vast masses of ice, which had escaped my notice formerly. Change is the order of the day here, and it is no uncommon thing to see, soon after a flood or freshet in the river, masses of earth, upon which trees thirty to forty feet high have grown, suddenly break away and fall with a tremendous roar into the river. I obtained sketches and photographs of these broken bluffs, but no picture can adequately portray the feeling of utter desolation which this destructive work of the ever-rushing river conveys.

The constant falling away of the soft earth, leaving the solid ice bare in many places, has given rise to many curious and fantastic formations.

Heads of men, women, and animals can be readily discovered, and if the enthusiastic tourist who sees in the pictured rocks of Lake Superior so much that is wonderful could gaze upon these icy cliffs, his emotion would be inexpressible.

For miles along the river in this portion of its course these icy cliffs appear and disappear at regular intervals, so that it is observed that they recur in bends that are parallel with each other, which would seem to indicate that its existence is not due to deposits of ice by the river, else it would be in all of the bends, but that its presence is due to some other cause. If a straight line is drawn through the center of one of these ice-cliffs, and through the ENE. and WSW. points of the compass, it will not only touch all of the cliffs, but if extended to the sea will touch the coast at a point very near Elephant Point, on Escholtz Bay, where, it is well known, a peculiar ice formation in the bluffs has been observed and commented upon by numerous scientific men.

Climbing to the top of one of these ice-cliffs, Mr. Townsend and I pushed our way through the dense thickets of willow and luxuriant growth of grass into the interior for about one mile, where we found a shallow lake about a mile in diameter, which I have no doubt had its origin

ICE CLIFFS, KOWAK RIVER.

ICE CLIFFS, KOWAK RIVER, ALASKA.

BROKEN BLUFFS OF ICE AND SAND, KOWAK RIVER.

KOWAK RIVER.

in the mass of ice over which we had been traveling. It is almost inconceivable how such a rank vegetation can be sustained under such conditions. If we stood in one place any length of time the spongy moss became saturated, and soon a pool of dark-colored water made our position untenable.

Besides the moss, berries, and stunted willows, clusters of spruce trees, some measuring six and eight inches in diameter, have taken root and grown in the thin strata of soil overlying the ice. To investigate this subject thoroughly would require more time than I have at my command, but from the superficial investigation of this peculiar formation I am inclined to believe that here are the remains of what was a moving, rushing river, lying frozen and still under the dank moss and black earth of the Arctic tundra.

On the afternoon of August 21 the expedition reached the Indian settlement where we had left a cache of provisions, boat sails, &c., in coming up, and we camped on a sand beach opposite. We found our effects had been well taken care of during our absence by the two old women who live here. During the recent freshet in the river they had been compelled to carry the coal which we had left on the shore far up the steep bank, and I could hardly believe that the feat had been accomplished unaided by the decrepit-looking old women; but upon inquiry I learned that such was really the case.

Apropos of this instance, illustrating the strength of the Innuit women, another case came under my observation which I consider worth relating. When about to abandon the launch in the summer of 1884, I wished to obtain a stone large enough to serve as an anchor, and as none was available on the spot, a woman volunteered to go some distance up a small tributary of the river and bring one down to us in her boat. When she returned with the stone, and I noted its size, I was truly astonished. It required two of my party, who were both remarkably strong men, to lift the stone from the boat. It could not have weighed less than eight hundred pounds, and how the woman got it into her frail bark canoe without assistance is more than I can understand. Tah-tah-rok, to whom I went for an explanation of the method pursued, told me that she had first filled her boat with small branches of spruce, and then, choosing a part of the bank where the boat's rail would be on a level with the ground, had rolled the stone over on to the pliant boughs, and so avoided lifting it at all. Afterwards the spruce branches were removed separately and the stone allowed to gradually sink to its proper position in the bottom of the boat. The fact that a body weighs less when submerged is as familiar to these untutored children of nature as to the most learned professor of natural philosophy.

So much has been written of these people which gives the impression that they are sluggish in disposition and intellectually inferior that I feel a natural hesitancy in advancing opinions (formed, it is true, by a short experience) which would seem to refute the tales of their stupidity. The fact remains, however, that in all my dealings with the natives of this region, embracing those from Cape Prince of Wales to Point Hope, and including the Noätak, Kowak, and Selawik tribes, I have never yet seen a more *naturally* intelligent set of men. They seem remarkably quick to adapt themselves to the wants and habits of civilized men; and if progress is the result of intelligence there seems to be no good reason why certain civilizing instruction should not be given them in order that their condition might be improved and the hard struggle for existence robbed of some of its terrors.

As a general rule (I might almost call it an universal one), the natives are honest, good-natured, and always hospitable, and if at times they prove mendacious, it would seem charitable to believe that this deflection from the moral code is caused by a desire to make it pleasant for the traveler temporarily made their guest. What these people need, however, is a little instruction on the benefits of habits of cleanliness. At present some of their customs are disgusting beyond description; but they are easily induced to change their habits of life when it is known that they are the source of annoyance to the white man. During the time I was absent from the launch I was necessarily thrown in very close contact with the Indians, and I found it only necessary to mention any of their habits as being objectionable to have it immediately dropped. It was my custom, in order to avoid the vermin (with which they are liberally supplied), to take a bath every night and make a complete change in my underclothing.

The natives noticed this, and expressed surprise that after being wet all day I should deliberately go into the cold water instead of getting thoroughly warm and dry before going to sleep. But when Tah-tah-rok explained to them my reasons they immediately began to imitate my practice, and the change in their appearance was truly most astonishing as well as gratifying during the short time we were together.

When I first saw Tah-tah-rok, in the summer of 1884, he was a good specimen of the average Esquimaux hunter, but in contact with white men he rapidly improved, and when we parted a more respectable or cleaner looking man could not be selected from an ordinary crowd of intelligent workingmen in any city of the United States. A present of a half-dozen towels and a bar of soap seemed to please him more than anything else I gave him.

Just opposite our camping place a small stream runs into the Kowak from the south, and from the high banks of the river we could see it was the outlet of several small lakes some three or four miles inland. Mr. Townsend and I took our guns and, getting into our small birch-bark canoes, struck out for these lakes to hunt for ducks, which the old women assured us were abundant in that direction. We had become quite expert in handling the rather "ticklish" canoes by this time, and we soon covered the distance between the river and the lakes. Here we found abundant sport, and after securing a dozen delicious little widgeons and teal we started on our way back to camp. Half way down the narrow stream which led to the river we suddenly came upon a flock of geese, and as they got up we fired into them. One or two were killed at the first shot and the flock flew off at right angles to our course. I incautiously fired again, this time "broadside on," and in a moment found myself struggling in the water with my boat upset and game scattered over the surface of the stream in the wildest confusion. With Mr. Townsend's help, however, I was enabled to extricate myself from my unpleasant position with no injury except a rather cold ducking.

The incident is related to illustrate the character of the small "one man" canoes which are in common use on the Kowak. No more graceful thing in the way of water craft can possibly be imagined than these canoes. They are from eight to ten feet long, and from twelve to fifteen inches wide on the water line. The stem and stern pieces are long, and so fashioned as to form, with the rail, a graceful curve, giving to the whole a finish which would delight the eye of the most exacting canoeist. The thin birch bark is fastened to the frame by means of strips of willow bark in the most ingenious manner, and the seams are made tight by rubbing them with melted spruce gum. On the lower river these canoes are never made, and but seldom seen, as birch bark is not to be obtained, and the natives use the common kyack or seal-skin canoe, common along the sea-coast.

The river at this point is exceedingly tortuous and altogether uninteresting. Its course is through the low tundra lands, which are bare of trees except on the immediate river bank, and as the mouth of the river is approached even these disappear and only rank grass and stunted willows appear. On the morning of August 22, after getting astronomical observations as usual, we bade good-bye to our Indian friends of the village opposite and steamed away down stream.

During the day we observed many hair seal in the river, and I am inclined to believe they come up stream to avoid their enemy, the narwhale, which frequent the waters of Kotzebue Sound. At 5 o'clock we passed out from the Kowak by its westernmost mouth, and our eyes, grown tired of the monotonous shores, were gladdened by the sight of the crisp, sparkling waves of Hotham Inlet.

A brisk easterly wind was blowing and I made haste to reach the protection which a sand-spit lying at the entrance to Selawik Lake afforded, and there we camped for the night. The wind rapidly increased and shifted to the southeast, so that a heavy sea soon began running in the lake and inlet. The surf beat heavily on the other side of our protecting sand-spit, but within our little basin the water was undisturbed.

A party of natives on their way to their winter homes on the Selawik River encamped near our camp, and from them I learned that all of the Indians had deserted the rendezvous at Hotham Inlet and were now on their way home; Mr. McLenegan had returned from his

TAH-TAH-ROK (GRANDFATHER).

exploration of the Noätak, and that the *Corwin* had been seen off Cape Blossom a few days before, on her way north, and had left word she would return by September 1.

Of our subsequent operations there is little of interest to relate. We stopped at this place long enough to get a set of observations. Having got the launch in sailing trim again, we proceeded leisurely down the inlet, sounding along the shores and examining the different entrances to the Kowak, of which we noted fifteen, and on August 24 we reached a sand-spit twelve miles from the entrance to Hotham Inlet, upon which Lieutenant Stoney had placed his supplies, and there found the *Explorer*, which had returned from up the river for another load, with Lieutenant Stoney in command. Here also was Mr. McLenegan, who had been anxiously awaiting the *Corwin*, and came this far to meet me on my way down the inlet. About one hundred and seventy-five Indians belonging to the Kowak and Selawik River region had encamped on the spit on their way home from the rendezvous. The howling of some fifty or seventy-five impatient dogs made night hideous; but the many fires along the beach, the huge boats turned over so as to form tents, and the crowds of Indians around the fires, formed a scene at once picturesque and novel.

Finally, on August 25, we parted company with Lieutenant Stoney's party, after transferring to him several small articles of outfit which would be of service to him, and our expedition now turned toward Hotham Inlet and Kotzebue Sound. We arrived safely at the rendezvous and took up our old quarters in the little lagoon called by me Refuge Lagoon, and, in commemoration of the meeting of McLenegan's and my party, we called the camp Reunion.

A few natives yet remained at the rendezvous, and were soon on hand to welcome us. One old fellow no doubt had been a close observer of the white men, for he brought with him and complacently offered for our delectation a copy of Harper's Weekly some twenty years old, with the request that after reading it we would return it. Some one had given this old fellow a high silk hat, and the solicitude with which he stowed it away under the covering of his boat on the slightest appearance of a shower was truly amusing.

While here we had an opportunity of witnessing a most singular performance, much resembling a spiritualistic *séance*. The wife of one of the natives, a blear-eyed old hag sixty or sixty-five years old, was observed to drop suddenly on the ground, and when we ran up to ascertain the cause she was to all appearances in a dead faint. Her lips were blue and teeth set hard together, while her labored breathing produced a light froth upon her lips. The eyes were closed, but when I opened them the pupils were much contracted, and the whole appearance of the eye was expressionless. Her husband immediately ran to her, and passing a stout deer-skin thong or strap around her head, secured it to the end of a stout staff about six feet in length. He then sat down near the woman's head, and brought the staff across his thighs in such a way as to make it a lever of the first class. Then he began in a chanting sort of tone to speak to some spirit of the dead and to ask questions concerning his probable success during the approaching hunting season. When a question was to be answered, he paused and tried to lift the head of the woman from the ground. If he succeeded in accomplishing this feat, the answer was construed to be *yes*, and if not, the contrary was to be understood as the answer. This performance went on for some time, and such was the force used by the man to lift the poor creature's head that at times I feared her neck would be broken.

During the *séance*, if we may so call it, the man had his rifle and hunting-knife brought and placed near by, for the purpose of ascertaining their good or bad qualities. When all had been asked and answered, the thong was removed from the woman's head, and, with a few passes exactly similar to those commonly used by mind readers, the woman was restored to consciousness. For a while she seemed dazed and unsteady, but soon commenced to narrate what she had seen while in the trance. She claimed to have been far away in the deer country, and to have seen relatives and friends of those present, who listened with rapt attention, and with the appearance of perfect confidence in her veracity, to the messages and news which she brought to them.

Without attempting to explain this curious exhibition of second sight, I leave it for

others to argue, simply stating, by way of testimony, that to me the woman seemed sincere, as she was most certainly unconscious during the greater portion, if not all, of the *séance*.

On the 26th of August the *Corwin* was reported off Cape Blossom, and we immediately broke camp and steamed out to join her.

The sea was smooth, and we crossed the bar safely and reached Cape Blossom about noon; but the *Corwin* had not stopped, and we were compelled to camp again and await her return, which I confidently hoped would be next day. She had doubtless run in, and seeing nothing of us had proceeded to Chamisso Island for a harbor during the night.

This supposition proved correct, for next morning at 6.30 she was observed steaming in toward Cape Blossom from the south, and at 8.30 we broke our last camp, and the sea being smooth we soon were all safely on board of the *Corwin* once more. I immediately made a short report of my explorations to Captain Healy; and so ended the second expedition for the exploration of the Kowak River, conducted under the direction of the Revenue Marine Service.

Respectfully submitted.

JOHN C. CANTWELL,
Third Lieutenant, Revenue Marine,
In charge of expedition.

AT
NIGHT

EXPLORATION OF THE NOÄTAK RIVER, ALASKA.

By S. B. McLENEGAN.

LETTER OF TRANSMITTAL.

U. S. REVENUE STEAMER RUSH,
San Francisco, Cal., December 31, 1885.

SIR: In obedience to your order dated July 1, 1885, directing me to explore the Noätak River, Alaska, I have the honor to submit the following report.

In the preparation of this work I have labored under many disadvantages, having been on active duty during the greater portion of the time, and without any facilities for doing the work properly. In view of the hurried manner with which the work was prepared, having been ordered to sea before its final completion, I trust that due consideration will be shown. I have only to express my sincere thanks for kind assistance in the work of revision.

Trusting that the results of the expedition will meet your approval,

I remain, very respectfully, your obedient servant,

S. B. McLENEGAN,
Second Assistant Engineer, U. S. R. M.

Capt. M. A. HEALY,
Commanding Revenue Steamer Corwin, San Francisco, Cal.

EXPLORATION OF THE NOÄTAK RIVER, ALASKA.

HISTORICAL.

Concerning a region so unknown to the world as the interior of Arctic Alaska, there is little to say from a historical point of view. Inasmuch as the history of any region dates from the earliest exploration of the same, that of Northern Alaska may be said to be in its infancy. All that portion of the Territory lying north of the Arctic circle, comprising, in round numbers, about one hundred and twenty-five thousand square miles, has been a vast geographical blank, the maps of which region are relieved only by vague lines representing the supposed rivers of the country.

The few writers who revert to the subject generally remain silent concerning it, or at most offer only a few conjectures regarding its probable nature and extent.

Petroff, whose exhaustive report on the "Population and Resources of Alaska" is our latest authority, dismisses the subject in a few words, and, save bare mention of the fact that the Kowak and Noätak Rivers were known to exist, he says nothing on the subject.

The earliest exploration in Northwestern Alaska of which we have any record dates from the year 1815; at that time Lieutenant Kotzebue, of the Russian navy, penetrated the Bering Straits, and explored the sound which bears his name, together with all the coast region as far as Cape Lisburne. After his time we have no further record until the voyage of Captain Beechey, R. N., who explored the entire Arctic coast in the year 1825. The surveys and charts made by this officer were very complete and remain leading authorities at the present day. Petroff is unaccountably silent regarding the work of this famous navigator, as well as others prominently identified with the country, and apparently favors the work of his own countrymen only.

Although Beechey explored and named Hotham Inlet, it does not appear that he discovered either of the large rivers flowing into it; at least, he makes no mention of the fact in his report. Since the time of these early explorers the region has been visited by many adventurous whalemen and others, and the entire coast, as far as the mouth of the Mackenzie River, is known to many of them. No portion of that inhospitable coast is so little known as Kotzebue Sound; the vast shoals which mark that body of water, together with the lack of commercial incentive, has turned the tide of enterprise in another direction and comparatively few whalemen are acquainted with the region.

The first attempt to explore the interior of that country dates from the year 1883. During the summer of that year Lieut. G. M. Stoney, U. S. N., then on board the *Corwin*, on special duty from the Navy Department, was dispatched to the head of Hotham Inlet in a boat manned from the cutter. After an absence of ten days he returned with the information that a large river, known as the Kowak, was discharged into the head of the estuary.

Although the existence of this river was undoubtedly known before Stoney's visit, there is no record of any attempt at exploration previous to his own, and the information he furnished concerning the probable extent of the river was the first authentic account ever given.

In the following year an expedition under the command of Lieut. J. C. Cantwell, and to which the writer was attached, was dispatched from the *Corwin* to explore the same river. After an absence of six weeks the party returned, having penetrated the region about three hundred miles. Lieutenant Stoney also explored the river the same distance. The accounts

furnished by these expeditions concerning the geography and topography of the country were the first ever given, and with these expeditions was inaugurated more extended work in the following year.

There was another river, however, known in the native tongue as the Noätak, discharging into the estuary about thirty miles north of the Kowak, and which seemed to have escaped notice. Although this river is figured vaguely upon the latest maps of Alaska, it was known only from native accounts, for there is no record of its ever having been visited by white men.

The traders of the Yukon River, whose knowledge of the country entitles them to belief, informed the writer that they knew nothing concerning it. Indians in their employ, however, had traded with a tribe living on a northern river, which, they asserted, might have been the Noätak, but aside from this statement nothing could be learned concerning it.

These facts are stated to indicate how utterly blank was that vast region even to those best informed upon the subject, and may convey a slight idea of the doubts and anxieties attending the work of exploration.

GEOGRAPHICAL.

Before entering upon a detailed description of the Noätak River and the territory through which it flows, it is thought that a brief review of the geographical and topographical features of the country would afford a clearer insight into the subject.

As we approach Kotzebue Sound from the direction of the Bering Straits, a long line of dark mountains gradually rises on the eastern horizon and seemingly extends to the very shores of the sea. A closer approach, however, reveals the fact that they are some distance inland and are separated from the sea by a plain three or four miles in width.

On the charts of the region these well-known landmarks are known as the Mulgrave Hills, and through which the Noätak flows immediately before discharging into the estuary. Opening inland from Kotzebue Sound and connected by a neck about three miles in width is a body of water known as Hotham Inlet, into which the Kowak and Noätak Rivers are discharged. For the most part the estuary is extremely shallow, a feature due to the vast quantities of alluvial matter deposited there by the rivers.

As already stated, the region immediately above the mouth of the Noätak is mountainous, a feature shared by no other river in Northern Alaska. Before entering the inlet the river divides in a V-shaped delta, the arms of which are about equal in volume. Uniting above, the Noätak almost immediately enters the highlands of the coast range; after passing through it trends in a northerly direction and enters a flat section of territory, throughout which it is divided into a maze of channels. The basin is bounded on either side by parallel ranges of hills, about ten miles distant, which, as we proceed, become higher, gradually assuming the shape and size of mountains. This section of the river is about one hundred miles in length, and is characterized throughout by shallow water and a rapid current. A slight growth of timber, consisting chiefly of spruce and cottonwood, is found along the immediate banks of the river.

As we approach the head of this section the mountains rapidly converge toward the river, and eventually confine it to a channel of ordinary dimensions. The Noätak now enters the third section of its length, namely, the mountain district. After passing through the Grand Cañons, which mark the entrance, the ranges again diverge, forming a beautiful valley from three to five miles in width. The ranges on either side are not continuous, but are broken in places pleasantly diversifying the scenery. They have, in general, an easterly trend, and follow the river for about one hundred miles.

The fourth, or upper section, comprises that part of the river lying on the table-lands of the interior, and exceeds in length that of all the lower sections combined. As may be inferred from the name, this region consists of an elevated plateau, rolling occasionally into hills and then stretching away into vast tracts of moorland.

The river is fed here by a number of lakes, none of which, however, are large or important. There is no timber of any description in the region, and the flora is limited to the hardier varieties of plant life.

It would be difficult to picture graphically that inhospitable country, a land that is drenched with the rains of summer and buried in the snows of winter. Near the headquarters the river divides into a number of branches, each of which has its source in a small lake.

Owing to the peculiar nature of the country the river is subject to sudden and great changes in volume. Floods are of common occurrence; the immense rainfall of the summer frequently causes the river to overflow its banks and inundate the surrounding country.

The Noätak is not navigable for other than native canoes; the many rapids, combined with the shallow water and rapid current, renders navigation with larger boats quite out of the question.

In regard to the possibility of a portage from the headwaters of the Noätak to those of the Colville River, careful inquiry among the natives failed to elicit any information concerning it. Indeed, if such does exist, it is probably too long and difficult to accomplish under ordinary circumstances. It is almost impossible to travel over the tundra lands during the summer season, but it is quite possible that the same could be easily accomplished during the winter by sledging.

The portage from the headwaters of the Noätak to those of the Kowak, natives assert, can be made in one day, a fact of much geographical interest. It would appear from this that the rivers are parallel and drain adjoining valleys. There are, however, no features in common between the rivers, or between the valleys drained by them—a fact which, considering their proximity, is very remarkable. One of the most interesting facts developed by a comparison is the distribution of timber. Along the waters of the Kowak, spruce, the predominating variety, is very abundant, and frequently attains a diameter of two feet. On the Noätak, however, it is quite the reverse, and the timber belt is confined to a very limited portion of the valley. The cause of this marked difference is possibly owing to the elevated nature of the latter region, and possibly also to some peculiarity in the soil.

It is to be hoped that the work of exploration may contribute somewhat to our knowledge of Northern Alaska, and that some of its problems have been satisfactorily solved.

NARRATIVE AND DESCRIPTIVE.

On the morning of July 2, 1885, the United States revenue steamer *Corwin* came to anchor off Hotham Inlet, and orders detailing me to explore the Noätak River were received from the commanding officer.

In anticipation of that event, all preparations had been previously made; the canoe, stores, instruments, and general outfit, necessarily limited, were brought on deck in readiness for immediate departure. The canoe, or three-hatch bidarka, such as is used by the natives of the Aleutian Islands, was procured at Ounalaska. It was twenty-seven feet in length and of about two feet beam; the top portion was, with the exception of the three circular hatches, entirely closed.

Soon after our arrival at Hotham Inlet a number of natives boarded the *Corwin*, and, with the hope of obtaining further information in regard to the nature of the river, some of the principal men were assembled in the pilot-house of the steamer. Although many of their number had traveled upon the Noätak, it was exceedingly difficult to obtain any definite information concerning it. The river was declared to be very swift, shallow, and difficult to navigate, and that it would be impossible to do so in the bidarka.

Unfortunately, the services of an interpreter could not be obtained, although my own slight knowledge of the language was sufficient for all practical purposes. I was thus forced to abandon my original intention of employing natives only, and having been granted the privilege of selecting a man from the crew, I named Seaman Nelson, who volunteered for the duty, to accompany me.

The services of a native guide could not be obtained, and, although the undertaking was a desperate venture, I determined to go without native assistance of any kind, and felt that we must depend wholly upon ourselves for the success of the undertaking.

At 10.30 a. m. the cutter was lowered, and our outfit was passed into it. After seeing

everything in readiness, I took leave of the captain and officers, and, accompanied by Pilot Douglass and Surgeon Yemans, started for the native rendezvous at Hotham Inlet. Upon arrival there we joined Lieutenant Cantwell's party, which had preceded us in the morning; but, having nothing to detain us, we determined to start for the river without delay. The moment of our final parting had now come, and, under the circumstance, knowing nothing of the dangers before us, it was not a pleasant one. With the appearance of cheerfulness, however, we bade them farewell, and resolutely turned the canoe towards the north.

The scene which presented itself on that beautiful afternoon was one to be remembered. On the opposite shore of the inlet, directly ahead of us, lay the dark and grim-looking "Hills;" on our right hand, stretching away toward the south and fading in the distance, lay the unruffled waters of Hotham Inlet, while on our left, where the sea and sky seemed to meet, lay the equally calm waters of the Arctic Ocean.

After following the shore-line for about three miles, I determined to land on the headland which marks the entrance to the inlet and obtain bearings of the mouth of the Noätak. According to the view presented the river enters the estuary through two large branches of about equal size, and after taking the bearing of the outlet on the extreme right, we resumed our paddles, hoping to gain the entrance before nightfall.

In its passage across the inlet the river channel is well defined, and frequent soundings developed from two to three fathoms of water the entire distance. On either side, however, it was very shallow, and at a low stage of water the sand-bars are frequently exposed. At this place the estuary is about five miles in width, and as we neared the entrance to the river, long sand-spits, covered with the débris of the spring freshets, extended fully a mile on either side of the channel.

The shore on both sides is very low and marshy, and during extreme high water the entire delta is submerged. A scattered growth of Arctic willows, extending to the water's edge, and an occasional spruce were the only visible suggestions of timber.

About four miles above the mouth the banks became somewhat higher and the timber more plentiful, although the latter was of a very stunted growth.

The day was now far spent and we were commencing to feel the fatigue attendant upon our new duties. At 9 p. m. we halted for the night, and pitched our tent upon the bank of the river. Here we were greeted effusively by our old friends, the mosquitoes, that swarmed around in prodigious numbers, and the warmth of their greeting was such as to detract considerably from our bodily comfort. Former experience, however, had taught me how to deal with them, so that we suffered but little from their attacks.

Thus the first day of the journey passed, and, encouraged by the prospect, we awaited the coming dawn to plunge deeper into the wilderness and unearth, if possible, some of the secrets which nature had guarded so well.

The result of our exertions was not felt until the next morning, when our stiffened limbs, unaccustomed to the work, were brought painfully into notice. The labor of breaking camp and preparing for the day's journey was sufficient to relax our muscles, and we were soon vigorously at work with our paddles.

As we advanced the banks became much higher and were quite thickly timbered with spruce. After gaining the head of the delta, the Noätak is broad and stately, and has from three to five fathoms of water throughout the channel. There is no current of any importance in this portion of the river, and in consequence our progress was quite rapid.

For the first eight miles of its length the Noätak has a northerly trend. The surrounding country gradually rises and finally breaks into the rugged coast mountains. About noon we gained a point where the river turns abruptly to the southwest, and I landed upon a large island to obtain a meridian altitude. One of the most remarkable features of the scene is the two isolated mountains off the right bank of the river, the bases of which are about three miles distant. The peculiar location of these peaks, their lofty summits and precipitous sides, form one of the most interesting sights in the region.

After obtaining an altitude and halting sufficiently long to boil coffee, we resumed our journey. We now entered the foothills of the range, and having no opposing current, made

very rapid headway. About four miles above our halting place the river again turned to the north and was divided by an island into what appeared to be three channels. Having selected the one on the extreme right and ascended it fully a mile, we found to our chagrin that it was merely a "blind," and were obliged to retrace our course to the main river again. The stream on the left is the main channel, the others being navigable at high water only. Having righted ourselves, we continued without further adventure during the day.

The banks of the stream now became quite precipitous, and in several places rocky cliffs from fifty to a hundred feet in height rose from the water's edge. The river also became very much narrower, but steadily retained the depth of three fathoms. A strong headwind rendered our progress somewhat slow, and we unfortunately shipped a quantity of water in one of the hatches, which, aside from the physical discomfort it caused us, to a great extent damaged the provisions.

As we were no longer within the pale of civilization and had no means of appropriately observing the "glorious Fourth," we resumed our journey early on that day. The scenery of the mountains, however, was of such a nature as to arouse our enthusiasm, and we pushed rapidly ahead, eager to see that which the next turn in the river might reveal.

A short distance above our camp we passed between two very high rocky cliffs, that on the starboard being marked by a very peculiar pinnacle-shaped rock, towering high above its fellows. Soundings in this portion of the river revealed from seven to eight fathoms of water, which depth, however, was not of long continuance. At this point the Noätak passes through the coast range and for several miles pursues a very tortuous course. Having a strong breeze in our favor, we made sail, which afforded us an opportunity to rest our weary arms.

The most remarkable feature of the coast mountains is the numerous isolated peaks, mention of which has already been made. Late in the afternoon we passed through the foothills on the opposite side of the range. The banks became lower and somewhat marshy, and all traces of timber were lost. The river now assumed a new and unpleasant feature, namely, a very marked current, which, as we proceeded, became so swift as to render our progress slow and laborious.

Masses of Arctic willows were found on either bank, and every feature of the landscape told us plainly of the difficulties which we must soon encounter. The favoring breeze of the past few days showed us that our work might be considerably lessened by enlarging our sail, so I determined to make one, before proceeding farther, sufficiently large to meet the requirements.

In a few hours' time we were again ready to proceed. We had not gone more than a mile before we gained a point where the current became very strong and all efforts to stem it were of no avail. The river now widened into a stream of twice its ordinary breadth, dotted with islands, and covering a vast tract of flats.

Thus far our tracking line had not been called into requisition, but it was now manifestly impossible to proceed without it. The numerous bars and shoals in the river, together with the strong current, rendered our labor exceedingly arduous, and we were frequently obliged to jump overboard to avoid being swept over the shoals. After contending with these difficulties for a few hours both of us became thoroughly wet and fatigued, the former condition at this stage of the journey being a new experience, although subsequently it became an everyday occurrence. During the morning I shot a fine pair of geese, which was an acceptable acquisition to our larder, for a steady diet of slap-jacks and bacon had caused the inner man to clamor for a change.

On the following day the surrounding country gave us no reason to hope for a better condition of affairs. The banks were very low, and the river presented a perfect maze of channels, none of which were well defined or apparently of a permanent character. It was impossible to struggle against the strong current with the paddles, and the tracking line was constantly in use. Most of the channels were small and insignificant, many of them not having sufficient water to float the bidarka. At this time the river was at a very high stage. Later, however, many of these channels become dry and the Noïtak is confined to a more definite bed.

The heavy rain which had commenced with the dawn continued throughout the day; in

addition to the many times we had been obliged to jump overboard it caused no little bodily discomfort and made our progress slow and disheartening. At nightfall we reached a point where the prospect was thought to be better, and we pitched camp in the midst of a drenching storm. Having had no opportunity to halt for luncheon on account of the rain, the pangs of hunger began to be felt; but now a fire was out of the question. After having gotten our equipage under shelter, we endeavored to satisfy ourselves with hard bread and water—a diet not calculated to increase the rigidity of the backbone.

The rain of the day continued throughout the night, and the following morning brought no change with it. Notwithstanding the dreary prospect, we resumed our journey, hoping to find a better condition of affairs further along. Contrary to my expectations, the nature of our work seemed more hopeless than before; the current seemed to increase in strength every mile of our journey, and before we had proceeded very far above the camp we were obliged to abandon the paddles and place ourselves in the tracking harness. The river banks at this point were such that tracking was next to impossible; the dense growth of bushes, together with the tangled mass of fallen timber along the shores, rendered our footing very precarious.

Shortly after starting in the morning we reached a very dangerous rapid, through which the turbulent waters dashed with an almost irresistible force, and I directed Nelson to adjust the tracking harness preparatory to passing around it. When all was in readiness I took the steering paddle and sheered the bidarka into the midst of the flood. The strength of the current, however, was greater than I anticipated, and catching the canoe under the bow, in an instant we were whirled into the torrent. While vainly endeavoring to check its mad career Nelson was dragged into the river and narrowly escaped drowning. In the mean time, by the severest exertion, I succeeded in heading the canoe inshore, and finally landed some distance below the rapids.

Profiting by these experiences, we soon learned to proceed with more caution and adopted safer methods of overcoming the dangerous obstacles.

The region through which our journey now lay was of the most forbidding description, and apparently almost destitute of life, both animal and vegetable. The adjacent country presented a most remarkable descent; mountains and hills which we had passed three days before seemed far below us, and every mile seemed to plunge us deeper into the solitudes of the region.

The river presented the same divided appearance, and no well-defined channel could be found. Late in the afternoon we reached a native village which apparently had been deserted only a few days before our arrival. It appeared to have been occupied during the winter. Several huts contained sledging outfits which had been cached until the return of the owners, who had probably gone to the coast on trading expeditions.

The heavy and protracted rains of the past few days had now caused very high water, and we found, to our dismay, that the current had nearly doubled in strength. The river gave no evidence of changing for the better, but, if possible, seemed to become more intricate and winding than before.

It was impossible to stem the current with our paddles, and even in places where the tracking line could be used it required our utmost exertions to drag the bidarka through the water. In addition to this, the drenching rains which still continued to fall, together with the cold winds, rendered our labor very arduous.

The basin of the river seemed to occupy a track several miles in width; the banks were very low, and an ordinary storm would cause it to overflow and inundate much of the surrounding country. Many of the channels were undoubtedly caused by the spring freshets, at which time the moving ice, impelled by the current, plays havoc along the banks, destroying the timber, plowing new channels, and frequently reaching even the native huts on the higher land.

Many of the huts we saw were in close proximity to the water, and in another year's time would undoubtedly be swept away.

On the following morning, the rain having continued throughout the night, the river had risen several feet, and it was very evident that we could not continue our journey until the waters had subsided. The hard usage to which the canoe had been subjected during the past week had worn it very badly, and it caused me no little anxiety, the constant succession of

rapids and the many dangerous rocks in the channel rendered the greatest care necessary to avoid the total destruction of the bidarka, which would bring, as an inevitable result, the complete failure of the expedition. On the preceding night, after pitching camp and making the usual preparations for rest, we hauled the canoe out on the bank; after retiring the thought occurred to me that perhaps the river might rise before the morning and endanger the canoe.

In order to "make assurance doubly sure," I lashed the craft to a neighboring tree, and very fortunately, too, for in the morning it was afloat, and undoubtedly would have been lost had not the precaution been taken to secure it. This narrow escape had the effect of redoubling our vigilance.

In the morning the Noätak gained the high-water mark, and about noon commenced to recede very slowly. The bidarka was now thoroughly water-soaked, as there had been no opportunity to dry it since leaving the *Corwin*. In this condition the skin becomes very soft and liable to tear, an accident which, owing to the severity of the work, might occur at any time. Upon examination, I discovered two of the seams over the keelson had given way and in many other places evidences of weakness were visible. After repairing the damage, the canoe was hauled out to dry. In the mean time I climbed a neighboring tree to obtain a view of the river above, and, happily, noted many decided signs of improvement. Having the assurance of better things, we went into camp hoping that the morrow would bring a ray of sunshine.

The following morning opened fair and warm; the long-continued storm had exhausted itself, and once more the sun shone in a cloudless sky. The canoe having been dried and oiled, was again in a serviceable condition, and I determined to resume the journey without delay. The river was still very high and we found it necessary to thread our way upward through the smaller channels to avoid the impassable current in the main river. After continuing in this way for several miles we finally reached a large stream which appeared to be the principal channel, but after following this for some distance found that it again divided into a net work of small streams and thereby made our work more discouraging than before. The entire valley has a most remarkable slope; in many portions, the rise was plainly noticeable in a stretch less than a half mile in length, a feature which accounted for the unusually rapid current. This, of course, caused our progress to be very slow and laborious. We had been in the water waist deep at times during the greater portion of the day, and consequently before nightfall became thoroughly chilled with the cold. After going into camp for the night our chilled blood, again put in circulation, produced a most peculiar burning sensation, which caused no little pain and utterly precluded the idea of sleep.

We had now gained one of the most desolate sections of country imaginable; in gazing over the portion already traveled nothing met the eye save an unbroken stretch of flats, unrelieved by forests or hills. Here and there a patch of Arctic willows, or perhaps a few scattered spruce trees, constituted the only variation to the scene. The sense of utter desolation and loneliness which took possession of the mind was indeed difficult to dispel, and at times seemed almost unendurable. No trace of human habitations could be found, and even the hardy waterfowl seemed to have forsaken the region, leaving nothing to remind us of the great and busy world thousands of miles below.

While at leisure the day previous I examined the river for some distance ahead, and found that by making a short portage we might save a considerable distance and gain time as well. Accordingly, we shouldered the canoe and carried it across to what seemed to be the main channel of the river. After transporting the outfit in a like manner, we loaded the canoe and resumed the journey.

The river was now much less divided and had a greater depth, although the current was yet very rapid. The banks were higher and of such a nature as to render tracking practicable; consequently we made much better progress. The surrounding country also improved greatly in appearance; the banks sloped back into a higher district, which was diversified in places by patches of timber, which thus far had been scarce. Spruce and cottonwood trees are scattered along the banks, but as a usual thing do not extend far inland. All the timber shows decided climatic repression, the trees seldom attaining a diameter exceeding twelve inches at the base.

On the north bank of the Noätak, about ten miles from our present position and trending nearly east and west, lay a long and rugged range of mountains; one group, occupying a somewhat isolated position, was particularly remarkable in appearance. The entire range, from base to summit, was of a light-red color and destitute of all vegetation, save a fringe of green around the base. The beautiful contrast afforded by snow-capped summits, red slopes, and green bases formed one of the most novel and interesting sights in the entire country, and offered a study well worthy an artist's brush.

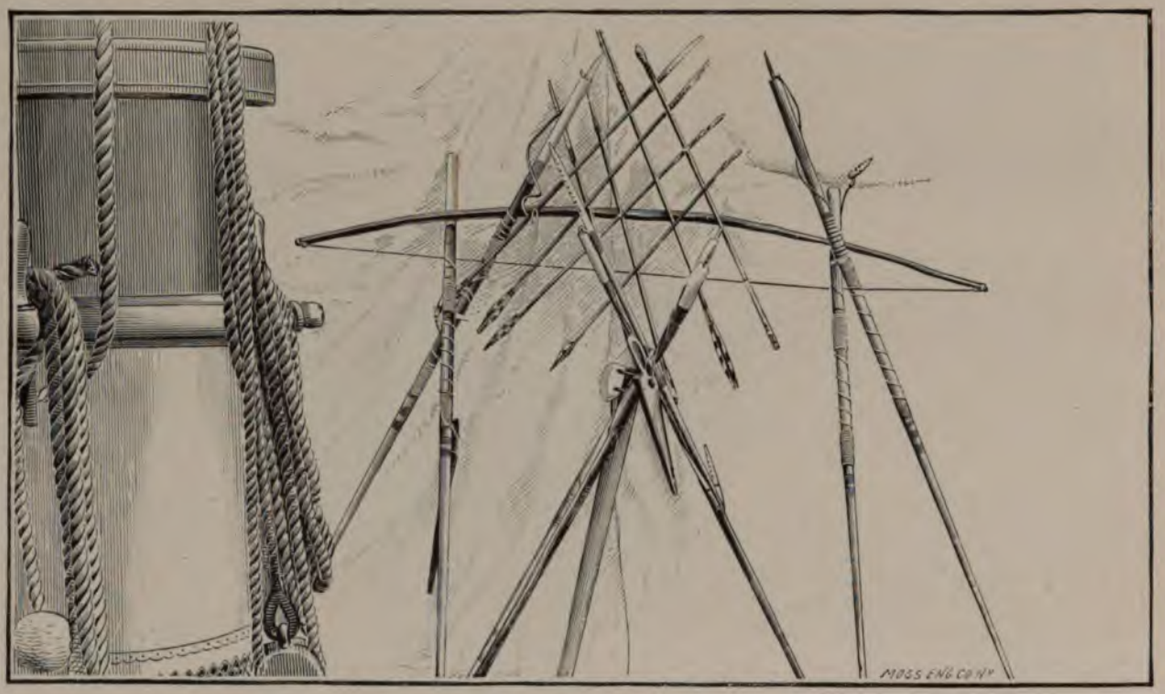
The following morning found us again tracking, striving to overcome the many opposing obstacles and gain the end of our expedition. The river again divided in its course and presented many almost insuperable difficulties every mile that we advanced. The constant succession of rapids rendered our work exceedingly hard, but the amphibious qualities of our nature made it a matter of little importance whether we were in or out of the water. About noon, however, we reached a point where the Noätak issued from a single channel, a condition which lightened our labor very materially, although the current seemed to have lost none of its original qualities. At times it required the united exertions of Nelson and myself, up to our waists in water, to control the unruly canoe, and then we were by no means always successful. Notwithstanding these difficulties, we made fairly good headway, although both were thoroughly fatigued at night. The country still presented the same severely desolate appearance; the mountains on either side began to converge toward the river, and some distance above seemed to form a solid wall directly across its path. It is needless to say that this was a most agreeable prospect, inasmuch as the river must needs be confined to a channel of ordinary width, a state which would render our work very much lighter.

The next day, July 15, seemed to inaugurate a new era in our work. At the usual hour we started on our way, alternately tracking and paddling, as the state of the river permitted. In many places a strong eddy was found along the shores, which was of great assistance to us, although the rocky nature of the banks made it necessary to proceed with great caution. About 10 o'clock a. m. we entered the highlands of the range and found, to our joy, that all the branches issued from one well-defined and narrow river. The difficulties attending our work during the past ten days had been very great, and we had frequently been placed in dangerous situations during that memorable time; but now the prospect seemed much brighter and we entered upon the work with renewed energy. With the now greater hope of reaching the headwaters, we placed ourselves in the tracking harness and summoned all our latent energies for the renewal of the work.

In many portions of the river the banks became quite precipitous, and frequently broke out into cliffs of solid rock. Shortly after noon we entered the Grand Cañons of the Noätak, a section about three miles in length, and by far the most interesting portion we had yet seen. Here the perpendicular walls rose hundreds of feet on either side, seldom offering a foothold along the bases, while the tops frequently overhung the river and seemed to threaten momentarily to topple over and crush us beneath their ponderous weight. As the river from above enters the cañons it plunges forward with an almost irresistible force.

Owing to the precarious footing along the cliffs, our progress was very slow, for it was necessary to track the canoe the entire distance. The many rocks which lined the banks, some of which were submerged, made caution necessary, and at times we narrowly escaped being dashed against them by the many cross-currents of the river. After emerging from the cañons the river enters a narrow valley, on either side of which are high ranges of mountains. There was no change in the general aspect of the river; the channel was marked by dangerous rocks, and the current seemed to have lost none of its strength. The fatiguing labors of the day began to make themselves felt ere nightfall, and at about 6 o'clock we went into camp for rest and recuperation.

Proceeding on our way the following morning, we dragged the canoe through a rapid just above camp, and after passing it continued to paddle for several hours without interruption. About 11 o'clock the weather, which had become unusually warm, gave evidence of a decided change. A large black cloud, which had darkened the eastern sky, gradually rose until it reached the zenith, when it apparently halted and fairly poured its liquid contents down upon



ESQUIMO BOWS, ARROWS, AND SPEARS.

ESQUIMO DOGS AND SLEDGE.

ESQUIMO BOOTS AND SHOES AND SNOW-SHOES.

ESQUIMO BOOTS.

us. I do not remember ever having experienced such a deluge as that which followed for an hour or more; but as our condition would not have been improved by stopping, we continued to plod along during the storm, although both were thoroughly soaked ere it ceased.

The river displayed no new or unusual features during the day, but continued its winding course through the mountains, affording us, in many sections, scenery of the grandest description. Here the banks were very bold, and in places huge rocky cliffs, the sides of which were worn in the most fantastic shapes by the water, towered hundreds of feet above the river. On one of the most inaccessible portions of the cliffs I discovered the nest of a white-headed eagle, the owners of which, fearing that we intended mischief, displayed very decided signs of anger, and would probabaly have resented very fiercely any intrusion upon their solitude.

One of the most noticeable features developed during the day was the entire absence of timber of any description; no driftwood could be found along the banks, and it was very evident that we had passed the timber limit and would soon reach the table-lands of the interior, if my theory in regard to the character of that region proved correct.

As we progressed the river became more and more obstructed with rocks, a condition which caused no litte anxiety on account of the canoe. In places of this kind I invariably led it through the rocks myself, and oftentimes became so benumbed with cold as to be incapable of motion.

The necessity for systematizing our work now became very apparent, and as no distinction was made in the performance of our duties, we took "watch and watch" on the tracking line. Under ordinary circumstances the man on the tracking line held an enviable position; during the cold and inclement weather the work of dragging the canoe was sufficient to keep the blood in circulation, while the unfortunate individual who held the steering paddle suffered greatly from cold, and on more than one occasion I took advantage of my position to make a forced trade with Nelson.

One of the most serious problems that now confronted us was the supplying ourselves with proper foot-gear. The heavy boots which we possessed in starting on the journey had become badly worn, owing to the severity of the work, and being without others to replace them, our situation was indeed serious. The native sealskin boots which we brought from the coast were quite useless, as so soon as they become wet the stitches give way and the skin tears irreparably. Our feet also began to feel the effects of the journey along the rocky banks, and often became so painful that it was difficult to stand upon them. However, nothing was permitted to interfere with our work, and we pressed forward, eager to accomplish something worthy of the effort.

The surrounding country now became somewhat less rugged, and on the whole was quite prepossessing. The mountain range which we had passed two days before now stood out in bold relief, forming a solid wall behind us, and apparently shutting off every means of escape to the coast. During the day we passed several small tributaries of the river, most of which hav their origin in the mountain lakes. Large game, consisting principally of bear and deer, seemed to be quite abundant; beaten paths over which they traveled to and from the river were found everywhere, as commonly as the familiar cow-paths in more civilized climes.

One morning, about 10 o'clock, as we rounded a sharp turn in the river, I discovered an immense buck regarding us intently only a few feet distant, and evidently puzzled as to our intentions. Fearing that the slightest move would alarm him we remained riveted in our positions, silently regarding the flashing eye and quivering nostril of the animal, until with a toss of his head he bounded away toward the mountains. Nature indeed is very beautiful in those wild, desolate regions, and I shall never forget the thrill of pleasure experienced as I stood gazing at that wild and untamed creature, which undoubtedly saw for the first time the face of a white man.

The next morning gave indications of a stormy day; dark masses of lowering clouds hung over the neighboring summits, and we had fully made up our minds to submit to another soaking. About noon the clouds began to break; to the southward, however, there was a very heavy storm, and the deep roll of thunder was heard during the entire day. Storms of this description are of very rare occurrence according to my experience, and, save in the instance noted, nothing of the kind ever came under my observation in Northern Alaska.

Our work from day to day was merely a repetition of former experiences, and by alternately tracking and paddling we continued to advance at a good rate of speed. The region through which our journey now lay was heavily rolling, the mountains being in broken ranges, and trending irregularly from WSW. to ENE.

Throughout the mountain district the river is shallow and the channel is studded with obstructing rocks. Aside from the usual dangers of navigation in places of this kind, nothing of special importance occurred. I shot a fine pair of willow grouse (*Lagopus albus*) during the day, July 18, which were the first seen in the region. We also noted an eagle's nest, containing two half-fledged birds, on a jutting crag not more than twenty-five feet above the water. It is very unusual to find them in locations of this kind and therefore specially noteworthy.

The following day being Sunday, it was my intention to devote the time to rest and recuperation after the arduous duties of the week, but I found many things which demanded immediate attention before resuming our journey. The wear and tear to which the canoe had been subjected had chafed the seams very badly, and it was necessary to patch the defective parts before proceeding. The skin was also water-soaked and required drying. After attending to these details I ascended a neighboring hill for the purpose of examining the surrounding country. On gaining the eminence I discovered several small lakes, none of which were more than a mile in length, and situated as they were, walled in by the mountains, their calm and unruffled waters presented an indescribably beautiful appearance, and the peaceful scene on that beautiful Sunday morning did much to soften the hardships which had attended our way. Although I had no opportunity to examine the interior of the region very extensively, there are undoubtedly many lakes of greater or less size than those examined which act as feeders to the main river.

The volume of water in the Noätak had greatly diminished within the past day or two, and navigation was attended with many difficulties.

The next morning opened dark and stormy, notwithstanding which we broke camp and resumed our journey at the usual hour. About 8 o'clock the impending storm burst upon us and the rain fell in torrents, thoroughly drenching and demoralizing us generally, although it was not allowed to impede our progress. The mountains now seemed to approach the river again, and the lofty summits towered hundreds of feet above it. The stream again pursued a very tortuous course, winding in and around the mountains, through deep cañons and gorges, where, in spite of the wretched weather, we could not fail to admire the grandeur of the scenery. In the mean time the fresh breeze of morning had increased into a gale which fairly whistled through the chasms, and hoisting our sail, we were driven rapidly forward, notwithstanding the opposing current in the river. The work now became exciting in the extreme. Steering the frail canoe into the eddy, we determined to make the best of the opportunity and gain every possible advantage. To Nelson I intrusted the steering paddle, while I held the sheet and employed every faculty in avoiding the submerged rocks, which seemed to threaten us with destruction. Imbued with a spirit of boldness bordering on recklessness, the canoe was driven before the gale.

In the afternoon the bed of the river began a most remarkable ascent, resembling in appearance a heavily-graded railway through a mountain district. With the assistance of the favoring gale and our united exertion with the paddles we succeeded in stemming the flood, and finallly gained the smoother water above.

About 4 o'clock p. m., July 20, we passed a large tributary on the left bank, which contributed fully one-third to the total volume below. The water from this stream was clear and beautiful, and evidently had its source in a mountain lake not far distant; the water in the Noätak was quite the reverse in appearance, and as the two rivers mingled each preserved its characteristic for fully half a mile below, the waters remaining entirely separate for that distance.

At this point the range of mountains on the right bank crosses the path of the river, trending about northeast. These are among the highest found in any portion of the region explored.

Directly above here the river, by a sharp turn, leaves the mountains and enters upon a

country of an entirely different character. Indeed, this sudden transformation of scene is one of the most peculiar and striking features of the Noätak River region.

As we entered upon this last section I cannot convey an idea of the picture which met our view. Behind us the dark wall of mountains through which we had just passed towered upward until their summits were lost in the clouds, and seemed like an impassable barrier, shutting us off from the outside world. Before us lay the level plains of the interior, stretching away in the distance, unrelieved by a single object upon which the eye could rest with any feeling of pleasure.

The gale, which had continued during the day, developed into a fierce Arctic blast that fairly benumbed us with cold, and in view of our miserably wet condition our position was anything but enviable. The lack of wood or fuel of any kind added nothing to our comfort, and for the first time I felt completely disheartened. Upon examining the river above I found, to my dismay, that it again branched out into a number of channels, none of which had sufficient water apparently to float the canoe, an emergency which in the present state of mind I was ill prepared to encounter. Having satisfied myself with the examination, I returned to the camp, hoping that the morrow might bring renewed courage.

The canoe was now found to be leaking badly, and a search revealed a very serious cut over the keelson, which, after two hours' labor, we succeeded in repairing substantially. It was now manifestly impossible to proceed further unless the canoe could be lightened, and with this end in view I determined to cache everything which could be spared from our already slender outfit, taking with us only the barest necessities sufficient for a period of three weeks. Having divided our stock of provisions, we left the greater portion of the flour, bacon, coffee, and surplus ammunition, all of which were lashed in a rubber blanket and secured on a platform made by bending together a number of strong willow bushes. The provision taken with us was not sufficient to meet our wants, but with the addition of the game which we might obtain it would be possible to eke out an existence for a few weeks' time. After having marked the spot and taken the proper bearings, we proceeded on our way without any mishap worthy of note.

The Noätak was now considerably divided, and we experienced the same difficulty in finding a definite channel that caused so much trouble at an earlier period. About five miles above the camp we were greatly relieved to find that all converged to a single channel, and entered upon our work with renewed interest. The landscape was one of the bleakest imaginable; not a sign of life was anywhere visible, and the cold, piercing blasts which swept across the tundra caused us to realize keenly the solitude of our position and only increased our desire to see the end of the journey.

During the night the Noätak rose fully two feet, and the effect was at once noticeable in the increased strength of current as we resumed our way next morning. The region through which we passed was similar in every respect to that of the day previous, concerning which there was absolutely nothing worthy of mention.

The cold winds which swept over moors were dispiriting in the extreme, and it was not in a cheerful state of mind that we dragged the canoe along the rocky banks of the river.

The utmost economy of provision was now absolutely necessary, and the limited allowance per day was beginning to make inroads upon our strength. I succeeded in shooting a few curlew, which Nelson incorporated into a kind of soup, almost as thin as the celebrated "Shadow" brand, but if not very sustaining, at least it served to fill the existing void.

The next morning opened cold and overcast, and it was with reluctance that we left the shelter of the tent and faced the cutting blast. At the usual hour, however, we were in readiness to move. About four miles above the camp we gained a somewhat smoother portion of the river, and resumed our places in the canoe preparatory to using the paddles. Meanwhile a fresh breeze sprang up, and, as usual, we made sail in order to lighten our labor. Proceeding in this manner for a mile or more we reached a rapid portion of the river, which I determined, if possible, to sail through, hoping to save the cold bath which would otherwise be involved, for the tracking line could not be used in passing it. By dint of hard work we had gotten about half way through when the bidarka fouled with a sunken rock. Before the

calamity could be averted the canoe had whirled broadside to the current and capsized. Fortunately the water was not deep, and so soon as our senses were recovered we righted the craft and put into the bank. A survey of the damage revealed only a thorough wetting, and our next impulse was to indulge in a hearty laugh, even though there was nothing particularly ludicrous in the situation. The canoe had partly filled with water, by which everything was more or less damaged. The only serious loss was that of our footgear, which, by some unaccountable means, had disappeared in the excitement of the moment. Otherwise than an icy bath, however, and the loss mentioned, we experienced no particular hardship.

I determined to go into camp in order that our effects might be overhauled before resuming our work. After getting the tent in order, I directed Nelson to cut some of the spare seal-skin into strips of sufficient length to be made into a rude moccasin which might at least serve as a protection against the sharp rocks, and before nightfall we were again shod and ready to advance. Indeed, the difficulties encountered only seemed to awaken the stubborn elements of our natures, and with a determination not to be baffled, we prepared ourselves to meet anything short of utter annihilation.

The next morning, July 24, the weather having moderated sufficiently, we again proceeded, but nothing occurred to vary the monotony of our labors. In the afternoon we entered a higher and more rolling country, and in places the river widened into a stream of twice its ordinary breadth. Here we found it so shallow that it was with great difficulty we succeeded in passing. In several places of this kind we were obliged to lighten the canoe before advancing. Late in the day we reached a deserted fishing village, the site of which was evidently selected with a view to utilizing the salmon spawning beds in the vicinity.

For a long distance here the river was marked by many dangerous rapids, none of which were more than a half mile apart, and between which the river was smooth, deep, and admirably adapted for spawning beds. The village is occupied only during the salmon run, which occurs soon after the ice moves out in the spring. Large numbers of fish enter the river at that time, many of which penetrate the extreme headwaters before spawning. When the young are sufficiently grown, usually about the middle of August, the retrograde movement begins, and, guided by the mysterious dictates of instinct, they start for the sea. The parent salmon, whose duties cease when the spawn are deposited, seldom or never return. Late in the season large numbers of dead may be seen floating down the river and the supposition is that all the parent fish perish before reaching the sea. In the mean time the migrating young have many dangers to encounter before reaching the open waters. Upon gaining the lower river they are met by large schools of seal (*Phoca vitulina*), and here, indeed, their troubled existence begins. Before passing this ordeal their numbers are sadly decimated, and not more than one-third of the original number ever reach the sea. Large quantities are also caught by the natives and dried for winter use. Several native caches, mounted upon tripods, were passed along this section, none of which, however, were examined.

The weather being very stormy the next morning, I determined to remain in camp. The constant exposure and hardship of the journey were beginning to tell upon our strength, and, in addition to other things, I did not consider it prudent to break camp and expose ourselves to the inclemencies of the weather. The heavy rains of the past few days had now swollen the river to such an extent that we were obliged to remove to higher ground. We found great difficulty in obtaining sufficient wood with which to prepare our scanty meals; willow branches and dry grass were the only available articles of fuel, and oftentimes even this failed us.

The next morning the storm had subsided and we proceeded on our way. The river was yet very high, and the current, augmented by the flood, had nearly doubled in strength, so that with difficulty we held our course. The Noätak now entered a low section of country, throughout which it was divided into a number of channels. A large number of lakes, each of which has an outlet into the river, dot the entire region, a fact which made it evident we were approaching the headwaters.

We passed a cache of native sledges during the day, the significance of which we realized a few days later, after reaching a point about fifty miles above it.

The almost entire absence of life is one of the characteristic features of this region. The sense of loneliness which frequently took possession of the mind was, indeed, difficult to throw off, and its influence was depressing in the extreme. The distance traveled during the day was accomplished by tracking exclusively; the rapid current and rocky channel rendered it impossible to use the paddles; for some distance we were obliged to drag the canoe through by taking to the icy water ourselves.

The river now became shallower every mile of its length, and in one instance it became necessary to portage the canoe. About noon, July 28, we passed a large tributary flowing into the main river from east-southeast, which contributed nearly one-half to the total volume of water below.

Late in the afternoon we found on the left bank what appeared to be a grave, and, prompted by curiosity, I determined to halt and examine it. Upon gaining the spot we discovered that it was a well-disguised cache, containing a large quantity of skins, native clothing, boots, and a general assortment of native possessions, together with a sledging outfit. The significance of these caches now became evident; the extreme difficulty attending the navigation above this point made it clear that the natives, on returning from the coast, abandoned the river here and completed their journey on sledges. This fact was rendered doubly certain by finding several abandoned bidarka frames in the vicinity, and this conclusion seems to be the most reasonable concerning the solution of it. Although it was an arduous undertaking, and one which might involve the destruction of the canoe, I determined to push ahead and reach some definite source if possible.

The next morning broke dark and overcast; a piercing southwest wind swept across the tundra that fairly benumbed us with cold, and it was with great reluctance that we turned out to face it. As we were preparing to start Nelson complained of feeling ill, and, indeed, his appearance fully attested the truth of the statement. After questioning I decided it would not be prudent to subject him to the exposure incident to the work, and determined to remain in camp. The icy cold water of the river through which we were frequently obliged to drag the canoe, together with the extreme inclemency of the weather, was sufficient to break down the strongest constitution, and the hardy sailor was not the man to give up until physically disabled. After making him as comfortable as circumstances permitted, I set out in search of game, but after a tramp of several hours returned without having seen any sign of life.

Nelson was now suffering from a high fever, and his condition alarmed me extremely. Towards evening, however, he improved somewhat and declared himself able to move on. The following morning I determined to break camp. I did not consider it prudent to allow Nelson to track, so put myself in the harness and we started forward. The morning was dark and gloomy; the cold winds continued with unabated vigor and the prospect was anything but reassuring or conducive to bodily comfort.

The Noätak was now a mere chain of rapids following in quick succession, and each seeming to surpass its predecessor in the dangers involved.

Shortly after starting in the morning, while passing one of these places, I lost my footing and was precipitated into the river. After gaining the bank and finding that the cold bath had not deprived me of speech, I gave vent to my feelings in a manner which could not be mistaken, but the subject of my remarks being somewhat irrelevant, they may be omitted here.

The channel of the river now became alarmingly studded with dangerous rocks, and in progressing neither the paddles nor tracking line could be used. The cross currents resulting from this rendered the canoe quite unmanageable, and I was frequently obliged to jump into the river to avoid disaster. Shortly after noon we passed two large tributaries, entering in close proximity on the left bank, above which the volume of the already shallow river was so diminished that further progress was almost impossible. Near the mouth of one of these tributaries there is an unusually dangerous rapid, where the sharp angular rocks seemed to threaten us with immediate destruction.

As the condition of Nelson's health was anything but reassuring, I insisted on his remaining in the canoe, and, after the severest exertion, succeeded in dragging it through the rapid,

not, however, before getting my third bath during the day in the cold waters of the river. Thus the day passed, and by nightfall the chilling effects of the work had completely benumbed me with cold, and we pitched camp just before the commencement of a drenching rain.

We had now gained a point, as accurately as I could estimate, about five hundred miles from the coast, having accomplished the distance in twenty-seven days' time. The journey thus far had been made without serious accident, and our frail canoe was still serviceable, notwithstanding the rough usage to which it had been subjected. The condition of the river was now such that it was not prudent to proceed further with the bidarka, for should any accident occur we should have no means of returning to the coast. No material of any description could be found with which to construct a raft, it being fully two hundred miles to the nearest timber growth. In view of the fact, I determined to leave the canoe and proceed on foot as far as circumstances permit, hoping in the mean time to reach the source of the river.

On viewing the stream from a neighboring hill it became very evident that we had passed the head of boat navigation and a point considerably above that traveled by the natives. The river was now very narrow, and in most places the water did not exceed a foot in depth.

The following morning, July 31, as we made preparations for starting, the rain began to fall in torrents, and I did not consider it advisable to proceed. During a lull in the storm I examined the river above for about two miles, but found no change for the better; rapid followed rapid, and with our previous experience in the work, I realized that it would be impossible to get a boat through in safety. After returning to camp we hauled the canoe out and carried it to a place of safety, where it was concealed.

Early the following morning we resumed our journey, taking with us a small quantity of provision, together with the instruments. The rain had now turned to sleet, and, driven by the fierce blast, it cut us to the quick. Thus pelted by the merciless storm we continued to follow the river. The surrounding region, a rolling plain, was partly covered with snow and water. The vast rainfall seemed to have inundated the entire country, and at times we were obliged to wade through the half-frozen moors, which extended to the very banks of the stream.

Thus we journeyed along, our work being unmarked by incident of note. Late in the day we gained an eminence on the right bank, which I determined to ascend for the purpose of obtaining a view of the surrounding country. Leaving Nelson at the foot of the hill to prepare coffee, I clambered up the steep sides, taking with me only the compass. The scene which met my gaze upon gaining the height was one of utter desolation. In every direction, as far as the eye could reach, the dreary expanse of tundra, covered with small lakes and half-frozen marshes, stretched away in the distance. The Noätak, no longer the stately river which flowed into the sea, had degenerated into a mere rambling creek, the waters of which would not float even our light canoe. Not a vestige of life was to be seen. Even the hardy water-fowl, that seek the solitudes of the far north, seemed to have forsaken the region.

As I stood on the height, pelted by the storm and chilled by the fierce Arctic blasts, my thoughts turned back to the home of other days. The fearful contrast of the scene before me and the other, so distinctly pictured on the pages of memory, left no room for expression, and with a sigh of relief I turned and joined Nelson below. Upon reaching the spot I found him vainly endeavoring to start a fire. There was no wood of any description to be found, and the dead grass was so thoroughly soaked as to utterly refuse to ignite; and, cold and fatigued as we were, we started back toward our camp, about twelve miles below, and at a late hour we reached it.

We had now gone beyond the head of canoe navigation and had reached, practically speaking, the headwaters of the river. The vast number of lakes which covered the face of the country, all of which were drained by the river, made it evident that it could not be traced to one source. Above us the Noätak divided into several branches, and as none were navigable, further progress was manifestly impossible. Every effort had been made to accomplish the object of the expedition, and now that we had achieved all that lay in our power, I determined to retreat without delay.

The exertions of the day previous had wearied us somewhat; consequently we were not astir till a late hour the following morning. The storm now increased in violence; the small brooks and creeks had swollen into torrents, in consequence of which the Noätak rose with alarming rapidity and bid fair to deluge the surrounding country. I now determined to prepare for our return trip; the canoe had leaked badly during the last few days of its use, although no defective seams could be found. Finally, however, I removed one of the patches and substituted a larger one, a measure which improved things materially. The discomfort occasioned by sitting in a pool of water cannot be aptly described, but it is not productive of a cheerful frame of mind.

After having overhauled the bidarka, and preparations being made for departure, we awaited more propitious weather to break camp, although no change took place during the day.

August 3, like the days preceding, opened very stormy, with the rain falling heavily; the river had risen several feet during the night and had nearly reached the camp, making it necessary to move without delay. Notwithstanding the down-pour, we broke camp, launched the canoe, and hastily loaded it with our effects in readiness for moving. To start down the river at that time seemed like a hazardous undertaking, for the ordinary dangers had now doubled; but at all events we could not remain in our present position. About this time the thought of possible danger to the cache occurred to me, and the alarming rapidity with which the river continued to rise was not at all reassuring. The cache lay about one hundred and twenty-five miles below our present location; to reach it that day would involve great exertion, and was an undertaking fraught with danger. After consulting Nelson, in whose judgment I had the fullest confidence, it was determined to start at once.

To describe the incidents of that exciting race would require an abler pen than mine; the dangers encountered on the ascending journey were now doubled. Rocks which before were plainly visible were now partly hidden by the flood, and every faculty was required to avert constantly impending destruction. In places of this kind the speed at which we traveled left no time for debate; an obstruction was no sooner sighted than we were upon it. Now resting on our paddles while borne swiftly along, the next moment we were straining every muscle to avoid the rocks which suddenly loomed up ahead and towards which we were dashing with locomotive speed. In places where the rocks were entirely submerged, the canoe seemed to be drawn toward them by some irresistible force, and before we learned to detect these places we had more than one escape from disaster. My fears in regard to the cache were greatly increased by finding those of the natives in very precarious situations, a fact which proved the flood to be almost unprecedented in extent. Several of those we passed were in dangerous proximity to the water, and in all probability were subsequently destroyed.

The story of this eventful day is one of excitement and danger; time and space cannot be devoted to the subject.

About the middle of the afternoon, having journeyed over seventy miles, our exertions began to tell upon us, and it was determined to halt for a brief rest.

The rain continued at intervals during the day, and from the appearance of the banks it was evident the river had not reached the high-water mark. After a delay of about thirty minutes, we again launched forth on the swollen stream and resumed the journey; on and on we sped, and our novel race became intensely exciting. The day was now far spent and we almost despaired of reaching the cache in time to save it from its imminent danger; but with the determination to do our best, we plied the paddles with redoubled vigor.

The sun sank lower and lower as we dashed onward toward the mountains where the cache lay, and finally the dark mass of storm-clouds which overshadowed them burst asunder and revealed their outlines in the distance. The long twilight of the Arctic summer fell upon us as we entered the flats through which the Noätak flows before entering the mountains beyond.

To my dismay, however, the river was found to spread over the entire section; a fact which put us decidedly off our bearings. The main channel, on the banks of which the cache lay, could not be distinguished, an emergency for which I was not prepared, and, well-nigh overcome with disappointment, we drifted helplessly onward, caring little where the waters might sweep us. In vain did we scan the banks for a trace of the familiar spot, but every

moment our fears increased that we were to be doomed to disappointment. Thus we drifted onward, tired and despondent, when, about a half mile below, a clump of willows was seen, around and through which the waters of the swollen river were washing, and, as a last hope, the canoe was turned toward it. As we were borne swiftly by I recognized the spot, and with an exclamation of joy we dropped our paddles and grasped the overhanging boughs to check the mad career of the canoe. A moment later the precious burden was lashed to the bidarka, and we determined to seek the first suitable place for camping. It was now very late, and the western skies, still lightened by the midnight sun, guided us to a resting place, where our long, adventurous journey was happily at an end.

The next morning was bright and cheerful, a beautiful contrast to the weeks of storm which we had experienced, and our spirits were in accord with the day. The long and arduous task of the previous day caused us to sleep late, and it was not until 10 o'clock that we saw the light of the sun. As soon as possible all of our wet and damaged outfit was spread to dry, and a few hours later everything was in order again. At noon, I obtained a meridian altitude, and during the remainder of the day prepared for the continuance of our journey on the following morning.

It was a matter of congratulation that we succeeded in reaching our cache, for, as I had anticipated, the river continued to rise during the night, and a very few hours later would have swept away our supplies. The long race was one of excitement and novelty, and having literally as well as figuratively "saved our bacon," we had ample provision to carry us to the coast. Before starting next morning we indulged in the luxury of a hearty meal, a pleasure which we had not enjoyed for some weeks past.

Our path now lay through the mountain district, by far the most interesting section of the river. The pleasure and excitement of a trip through the mountains can hardly be realized; the narrow defiles and deep cañons, beautiful valleys, and rolling hills, afford such a variety of scenery that the eye never tires, and scene passes scene only too quickly. It was pleasant as we glided along to regard the swiftly moving banks; the "tracking line," together with the attendant toil and the involuntary baths, were now things of the past, and the genuine comfort afforded by the reflection was fully worth the weeks of labor expended in its attainment.

The river had fallen about eight feet during the past day; indeed, that peculiarity was one of the most noteworthy, showing conclusively that the volume is due entirely to the rain and snow fall and not to a constant supply. Having an abundance of time, we proceeded leisurely, using our paddles only sufficiently to afford steerage-way, and at 3 p. m. went into camp.

During the remainder of the day we replenished our larder with game, an abundance of water-fowl being found on a neighboring lake. The weather still continued stormy, with rain and westerly winds, although much warmer than that experienced on the table-lands.

Being desirous of obtaining meridian observations at this point, we did not bestir ourselves until late next morning; meanwhile we employed our time with necessary overhauling until about 11 o'clock, when I directed Nelson to launch the boat and prepare for getting under way. After obtaining altitudes we again launched forth on the swift current.

The work of traveling was now comparatively light; the paddles were plied easily in order to give the canoe steerage-way, although the frequent recurrence of rapids rendered a sharp lookout necessary. About 2 o'clock we entered the foot-hills of the range through which the river flows before its final entry into the flat lands below. Late in the evening we gained the rapids above the cañons, and, with a common impulse, grasped the paddles for the coming struggle. Finally, after rounding a sharp turn, the cañons suddenly loomed up ahead, the lofty walls of which towered hundreds of feet above us. Swiftly we were drawn in by the rushing waters and soon gained the gloomy depths of the gorge. Every faculty was now on the alert, for the dangers seemed to multiply as we advanced. The wild rush of the river, mingled with the scream of the eagles and the madly dashing canoe, all contributed to the excitement of the moment.

The walls of the cañons form an interesting geological study, although but little opportunity was given us during the passage through to note the many points of interest. The remarkable figures formed by the bent and twisted strata, apparently the result of some violent convulsion

of nature, simply defy description. One of the most noticeable sights was an immense letter **Z**, formed doubtless by some great upheaval which bent the strata in the shape described; the angles of the letter were well defined and the entire effect so striking as to render it a most remarkable phenomenon.

The journey through the cañons is accomplished only too soon, and as we finally emerged from the gloomy depths, with a common impulse we turned to gaze once more at their wonders, as if to impress them upon the memory.

We left the grandeur of the mountains behind us and plunged into that dreary stretch of flats through which the river runs almost to the sea, and our work, no longer among the stimulating scenes described, became a monotonous and cheerless duty. At 6 o'clock we went into camp for the night, having covered the portion of river ascended on July 14, 15, and 16, a fact which will convey an idea of the velocity of the current.

The next morning Nelson was dispatched in search of game, an abundance of which was found in the vicinity. Large numbers of geese, duck, and wading birds nest in this region and remain until early fall. At the time of our homeward journey the young birds were well grown and afforded one of the greatest luxuries imaginable, especially after the somewhat abstemious diet which had been forced upon us during the summer.

One of the greatest misfortunes that befell us was the loss of our salt, an accident which occurred some time previous, and the lack of which was keenly felt. It is one of the most indispensable accessions to a camping outfit, and great care should be taken to have an abundant supply.

Shortly before noon we again broke camp and resumed our way through the lower wilderness. The high water, owing to the still-continued rainfall, rendered our work comparatively light and the rate of speed correspondingly rapid. In its course through the flats the Noätak, no longer confined by the wall of mountains, spreads itself over a large portion of the valley, a feature that makes it difficult at times to locate the main channel. It was generally possible to do so, however, by following the stronger current.

During the afternoon the rain fell in torrents, which, accompanied by a cold wind, created much discomfort.

The distant mountains were covered by a heavy fall of snow, and the inclement weather indicated an unusually early winter. The rainfall of the past summer seemed to be almost unprecedented; certainly during my own experience in Alaska I never saw anything to equal it.

Late in the day we passed a native camp, but, on account of the storm, passed by without halting, as we were desirous of camping several miles below.

The next morning, August 8, we determined to reach the coast mountains, if possible, before night, and accordingly were astir and ready to move early in the day. The portion of the river before us was that covered during the first week, a period full of the most painful recollections.

As already stated, the Noätak is confined to no definite channel here, but, according to the stage of water, is spread over a tract several miles in width. In most portions, however, there is generally one channel through which the greater volume flows, and is indicated on the chart of the region. As the side channels are not of a permanent character, they are not shown on the chart.

Our journey through was devoid of any incident of note. The current runs from ten to twelve miles an hour, and, as we were desirous of gaining our destination before night, we plied the paddles vigorously, hoping to accomplish it. At noon we halted for lunch, and shortly after starting again passed several bidarkas returning from the coast. In consequence of the flooded river they were progressing very slowly, a spectacle which, I regret to say, amused us exceedingly, particularly as we were gliding down on a current of fully twelve knots.

A short distance below this we saw several seal, and further down they became very abundant. I cannot express the sense of relief afforded by these signs of our proximity to the coast. Late in the day, as we entered the highlands of the coast mountains, the erratic stream converged into one channel. The Noätak now ran parallel with and directly behind the Mulgrave Hills,

the well-known landmarks of Kotzebue Sound, and, being fatigued from our long day's work, we hauled out for the night.

The next day being Sunday, we remained in camp, feeling that after the hardships and fatigues of the week we were entitled to one day for bodily rest. Although our proximity to the coast made us anxious to conclude the journey, I did not feel warranted in breaking the custom which we had observed during the entire journey.

The following morning, having fully recuperated ourselves, we made preparations for an early departure. The cold and rainy weather which we had experienced so uniformly during the summer gave no evidence of improvement; in fact, a short time after getting under way it began to rain very heavily, and with its usual accompaniment of piercing wind it had the effect of thoroughly chilling us.

A short distance below the camp, along the low, sandy banks of the river, hundreds of geese and ducks were congregated, a sight recalling vividly an old-fashioned poultry yard. As we passed by they manifested no alarm more than to keep up an incessant gabbling, apparently debating with regard to the intentions of the strange-looking individuals.

Proceeding down the river under sail, for we had the wind in our favor, rapid progress was made for several hours, until a bend in the river brought the breeze ahead, when the paddles were again called into requisition. Early in the day we entered the coast range, through which the Noätak flows before discharging into Hotham Inlet. As already stated, these mountains are marked by many isolated peaks, most of which were covered by a heavy fall of snow. At noon we halted for lunch; fortunately the rain ceased long enough to enable us to dispose of it with some degree of comfort, but soon after starting the weather assumed its normal condition of general unpleasantness.

About 2 o'clock we entered the "home stretch" of the river and eagerly strained our eyes to catch the first glimpse of the sea. In the distance, on the opposite shore of the inlet, the clear-cut headlands stood out in bold relief against the evening sky. The feelings of joy and relief which rose within us found no room for expression, and the prospect of a speedy termination of our journey, after the many hardships of the summer, was indeed cheering.

As it was now getting late, it was determined to camp on the delta, and conclude our journey across the inlet in the morning. In anticipation of reaching the rendezvous in the morning, we broke camp very early and launched the canoe for the last time on the waters of the Noätak.

The morning was bright, and the sun, which we had seen so seldom during the summer, shone out in a cloudless sky. As we cleared the river and entered the beautiful waters of the inlet the scene was one to be remembered.

After taking the necessary bearings of the opposite headlands, we took the paddles and stood down the extreme right outlet of the river. On either side and extending far out into the estuary there are long, flat bars which form a lodging place for the débris brought down by the floods. The channel is well defined and deep; three fathoms of water are found the entire distance, and no difficulty was experienced in finding the proper one.

Aided by the strong current which the Noätak maintains to the last, we soon gained the opposite shore, where the waters of the Kowak and Noätak mingle and flow through a common channel into Kotzebue Sound.

We now headed for the rendezvous, where I hoped to obtain tidings of the *Corwin*. Upon reaching the appointed place we found the coal left for the use of the steam launch, together with the letter concealed in one of the sacks. From this we learned that the cutter had gone to Point Barrow, in consequence of which our stay at this point would be somewhat protracted.

The news of our arrival was soon made known among the natives, and during the remainder of the day we had a constant influx of visitors.

Many familiar faces were recognized among the number, some of whom I had seen the year previous on the Kowak. One friend whom I knew very well, Nug-a-luk-ruk by name, upon learning that we were in need of provisions, suddenly disappeared, returning several hours later with a small quantity of sugar and a pound or two of white beans. The simple generosity of these untutored people is very touching, and, small as the gift was, it displayed

a kindly spirit toward the stranger from which we, who have greater opportunities, might learn a wholesome lesson in humanity and self-denial.

Thus the day passed and the journey was at an end. With feelings of intense relief we laid down the burdens and anxieties which had attended our way, grateful, too, for the measure of health and success which had rewarded our efforts.

GENERAL NOTES.

THE NATIVE POPULATION.—Concerning the native population of the Noätak River region, the subject need not be dwelt upon at length. While the region under discussion is entirely new to explorers, the life history of its people could not be treated at length without repeating many facts which are already well known, and which in the present instance would be highly undesirable.

By reference to the travels of Beechey and those of other explorers since his time the accounts published concerning the hyperborean races of Alaska are simply an oft-repeated tale. The comparatively few and widely scattered inhabitants of this region are a branch of the Innuit race, or those who occupy all that portion of the territory lying north of the Yukon River. Considering the vast extent of that region, the population is quite insignificant, numbering at most three or four thousand, all told. Of this number only a very small percentage belong to the Noätak country. The difficulty of arriving at an exact estimate of the population is quite apparent, and it is doubtful whether the result would repay the labor involved in obtaining an actual count.

Like all the northern races, these people lead a nomadic life, changing their base as often as is necessary to find fresh hunting and fishing grounds. During the summer months a large portion of the population, or at least the more enterprising portion, journey to the coast for the purpose of trading, while the more shiftless elements remain in the villages and enjoy the doubtful honor of assisting the women in fishing. In civilized communities this task might be regarded with more favor, but, if the truth must be told, the spirit of chivalry is not a prominent characteristic of the average native, and an individual of this sort is not apt to be regarded by his fellow-men with any great degree of favor.

The greater portion of the inhabitants reside near the extreme headwaters of the river, to which place they repair on the approach of winter. This locality is selected because of the peculiar advantages it offers for hunting and trapping, pursuits which form their sole means of subsistence.

During the summer months they wander up and down the river, spending much of the time in fishing and providing for the needs of the coming winter. They have no tribal organization; there is usually one man in a village who is known as the vomélik, or chief, but he has none of the authority usually implied by the name, and practically has no power over the others. Shamanism, or the rule of superstition, seems to be the only governing spirit among them.

In justice to these people, however, it should be added there is little need of anything of the kind. The simple code of right and wrong which enters into their dealings with one another is sufficient to meet all the requirements of their existence, the very simplicity of which is such that every individual thoroughly understands it and seldom or never violates the obligations carried with it. The men are good fathers, kind to their wives, considerate of the aged, and in times of need seldom fail to provide for those depending upon them, qualities which testify to the effectiveness of their simple code of morality. To our shame, however, it must be confessed that when brought into contact with our boasted civilization the result has been disastrous to the native, for he readily imbibes the vices, but seldom any of the virtues of our race.

In person the Noätak natives are much taller than those of the coast, and apparently unmarked by the diseases so prevalent among those of the latter region. They are also a much hardier people, and undoubtedly longer lived as well. The long and arduous journeys of the summer, together with the life of exposure while on their hunting trips in winter, are such as call for the greatest physical endurance, and they could not be performed by other than a hardy

race of people. All those whom we saw at the coast, belonging on the Noätak, were physically of a superior order, and when seen in proximity to those subject to the debasing influences of the illicit traders, the contrast was really startling. Among the number were several very old men, which, as is well known, is a rare sight among the northern races.

Natives of the Noätak region are in constant communication with those of the Kowak, and possibly also with those of the Koyukuk River; the latter fact, however, I cannot state with any degree of certainty. From their own accounts, there is no communication with the Colville or any other river flowing northward into the Arctic Ocean; indeed, it is very doubtful whether that region is inhabited at all.

In the recently issued report of Lieutenant Ray, U. S. A., concerning his work at Point Barrow, he makes no mention of having communicated with any natives from the interior. If any were known to inhabit the valley of the Colville, it seems more than probable that the Point Barrow natives would have some knowledge of the fact. Indeed, the barren and inhospitable character of that region almost precludes the idea of any settlement existing there.

In regard to the number inhabiting the Noätak Valley, estimates prepared from the best obtainable data place the number at two hundred and twenty-five, which it is thought fully covers the total population.

MINERAL RESOURCES.

It would be a difficult matter for any one not having a specific knowledge of the subject to state, with any degree of certainty, what minerals might be found in the region. The cursory manner in which the country was necessarily examined as we journeyed through it would hardly admit of any positive assertion on the subject.

Strangely enough, we saw no evidence of coal in any portion of the region. Notwithstanding its abundance along the Lower Kowak River, we found no indications of it along the Noätak, or any land which might be presumed to possess a coal-bearing formation. If this be the case, the coal-belt, which was supposed to extend from the vicinity of Cape Lisburne in a southerly direction through the territory, is broken in the valley of the Noätak. In regard to other minerals, especially gold, I have not a sufficient knowledge of the subject to make good any assertion concerning it.

I have seen quantities of iron among the natives, which they say is found abundantly in this region, and concerning the truth of which I am almost positive. The great similarity existing between the mountainous portion of the country and other localities where iron is a staple product leads me to believe that such is undoubtedly the case, although, with an inborn shrewdness, the natives steadily refuse to divulge the locality.

I saw, in the bed of the river, quantities of the so-called jade, which in reality proves to be serpentine, and which is probably found in the mountains. In the native cache, mention of which is made elsewhere, we found a large number of implements made of the finest translucent nephrite, or greenstone, and which undoubtedly came from this region. It is a matter of much regret that I cannot throw any additional light upon this interesting subject beyond the mere mention of the fact.

Although the implements in question would have been exceedingly valuable, I did not feel warranted in molesting them.

ORNITHOLOGY.

It is to be regretted that the time at my disposal was not sufficient to form an extended series of observations on this subject; those submitted are merely fragmentary, or such as came under my observation while in the performance of other duties, and noted at moments of leisure.

The species enumerated in the following synopsis should not be taken as a complete list, but may at least serve to indicate those varieties most common and characteristic of the region.

The numbers refer to those in Ridgway's "Catalogue of North American Birds."

3. Hylocichla aliciæ *Baird.* GRAY-CHEEKED THRUSH.

A very common and moderately abundant resident of the entire region. Nests early in July, and departs the latter part of August.

7. Merula migratoria (*Linn.*), *Sw. and Rich.* AMERICAN ROBIN.

Rather less numerous, but nearly equal in range with the preceding species. Confined chiefly to the lower and mountain sections of the river.

9 Hesperocichla nævia (*Gmel.*), *Baird.* VARIED ROBIN.

A single specimen of this beautiful bird is the only record obtained. Possibly a straggler from the Kowak Valley, where it is moderately abundant during the summer.

45. Parus Hudsonicus *Forst.* HUDSONIAN CHICKADEE.

A regular resident of the timbered section of the valley; partially migratory during the winter.

148. Lanius borealis *Vieill.* GREAT NORTHERN SHRIKE.

Common in the lower and mountain districts, although not abundant anywhere in the Noätak region. Nests in the spruce timber.

154. Hirundo erythrogastra *Bodd.* BARN SWALLOW.

Found everywhere in varying abundance, especially in the vicinity of the abandoned huts of the natives. Have seen the nests in places of this kind.

157. Cotile riparia (*Linn.*), *Boie.* BANK SWALLOW.

Much less abundant than the preceding species. The banks of the river are not well adapted for them.

193*a*. Passirculus samirchensis savanna (*Wils.*), *Ridgw.* SAVANNA SPARROW.

Apparently not abundant in any section; noted on a few occasions, and the familiar song was often heard when the species was not seen. Probably a regular summer resident.

207*a*. Zonotrichia gambeli intermedia *Ridgw.* INTERMEDIATE WHITE-CROWNED SPARROW.

Noted on several occasions along the lower river. A beautiful but not an abundant songster.

208. Zonotrichia coronata (*Pall.*), *Baird.* GOLDEN-CROWNED SPARROW.

Found in the same localities and about equal numbers with the preceding species. A regular summer resident, nesting in the bushes along the banks.

273. Scolecophagus ferrugineus (*Gm.*), *Swains.* RUSTY BLACKBIRD.

A small flock was observed along the lower river on one occasion; possibly only stragglers from the Kowak Valley, where they are moderately abundant.

280. Corvus corax carnivorus (*Bartr.*), *Ridgw.* AMERICAN RAVEN.

A moderately abundant resident of the entire region. Nests in the spruce timber along the river banks, and is partially migratory during the winter.

297*b*. Perisoreus canadensis fumifrons *Ridgw.* SMOKY-FRONTED JAY.

A summer resident of the timbered district, and noted on several occasions in the vicinity of our camps endeavoring to follow its pilfering instincts. Migrates to Southern Alaska during the winter season.

382. Ceryle alcyon (*Linn.*), *Boie.* BELTED KINGFISHER.

A very rare summer resident; possibly only a straggler from the region of the Kowak.

406. Nyctea scandiaca (*Linn.*), *Newt.* SNOWY OWL.

Apparently not abundant, at least it did not fall under my observation except at rare intervals. Undoubtedly a resident during the entire year.

420. Tunninculus sparverius (*Linn.*), *Vieill.* SPARROW HAWK.

More or less abundant throughout the region, but principally in the mountain districts. Nests about the middle of July.

430. Circus Hudsonius (*Linn.*), *Vieill.* MARSH HAWK.

Found abundantly along the lower river; quite common. Nests in the spruce timber early in July.

447. Archibuteo lagopus Sancti-Johannis (*Gmel.*), *Ridgw.* AMERICAN ROUGH-LEGGED HAWK.

Noted in several instances, and the nests found in two instances, along the lower river. A regular migrant to Northern Alaska.

451. Haliæëtus leucocephalus (*Linn.*), *Savig.* BALD EAGLE.

A regular summer resident and nesting commonly in the mountain districts. The most common bird of prey in the region.

474. Lagopus albus (*Gm.*), *Aud.* WILLOW PTARMIGAN.

Found commonly in pairs, but apparently not abundant in any locality. A resident of the mountain and table-land district. The young are fledged about the middle of July.

513. Squatarola Helvetica (*Linn.*), *Cuv.* BLACK-BELLIED PLOVER.

A common resident of every part of this region, usually found in pairs, and nests in every locality.

514. Charadrius pluvialis *Linn.* GOLDEN PLOVER.

A small flock observed near the extreme point reached is the only record in the region. They probably nest in the far north.

517. Ægialites semipalmatus *Bonap.* SEMIPALMATED PLOVER.

Observed commonly in pairs throughout the lower river districts. Nest on the sand or gravel banks early in July. They are not an abundant species.

527*a*. Macrohamphus griseus scolopaceus (*Say*), *Coues.* RED-BELLIED SNIPE.

A very abundant species on the upper portion of the river. After the nesting season they associate in large flocks and migrate the latter part of August.

538. Actodromas minutilla (*Vieill.*), *Bp.* LEAST SANDPIPER.

Found throughout the region, chiefly in pairs, but not abundant anywhere; undoubtedly a regular resident.

541. Ereunetes pusillus (*Linn.*), *Coss.* SEMIPALMATED SANDPIPER.

A moderately abundant wader, found chiefly along the lower river, and nesting wherever found.

542. Calidris arenaria (*Linn.*), *Illig.* SANDERLING.

Observed on several occasions along the gravelly banks of the lower river. Apparently a summer resident, although irregularly distributed.

549. Totanus flavipes (*Gmel.*), *Vieill.* YELLOW-LEGS.

A noisy denizen of the marshes along the lower river, not extending into the mountain district. Nests in the marshes, and is easily known by its peculiar habits.

559. Numenius Hudsonicus *Lath.* HUDSONIAN CURLEW.

An abundant species on the upper river. In the fall they resort to the coast region in large flocks previous to migration.

560. Numenius borealis (*Forst.*), *Lath.* ESKIMO CURLEW.

This species, together with the red-bellied snipe and the Hudsonian curlew, forms the three most abundant species characteristic of the region.

584. Grus fraterculus *Cass.* LITTLE CRANE.

A rather rare resident of the Noätak region, and principally along the lower river.

588. Olar Americanus (*Sharpless*), *Bp.* WHISTLING SWAN.

A small flock observed near the delta of the river is the only record obtained. Not abundant, but a regular summer resident.

593*a*. Anser albifrons gambeli (*Hartl.*), *Coues.* AMERICAN WHITE-FRONTED GOOSE.

Found almost exclusively along the lower and marshy sections of the river, where it is very abundant.

594*b*. Bernichla canadensis leucoparia (*Brandt*), *Cass.* WHITE-CHEEKED GOOSE.

An abundant summer resident of the entire region, and nesting wherever found.

605. Dafila acuta (*Linn.*), *Bonap.* PINTAIL.

A moderately abundant species, found along every portion of the river. Nests in every section among the marshy lands.

607. Mareca Americana (*Gmel.*), *Steph.* BALDPATE.

Observed singly or in pairs everywhere along the river. Saw young birds about middle of July.

612. Nettion Carolinensis (*Gmel.*), *Baird.* GREEN-WINGED TEAL.

A summer resident of the fresh-water ponds and marshes near the coast. Not an abundant species.

620. Clangula glaucium Americana (*Bp.*), *Ridgw.* AMERICAN GOLDEN-EYE.

A single pair observed on the lower river are the only representatives of this species I have ever seen in Alaska. Possibly they may have been only stragglers, and are extremely rare.

628. Somateria v. nigra *Gray.* PACIFIC EIDER.

A single specimen of the male bird seen about three hundred miles above the mouth of the river is the only record obtained. Probably a straggler only. I was not aware that they ever left the sea-coast.

637. Mergus serrator *Linn.* RED-BREASTED SHELDRAKE.

A moderately abundant species, found along the entire river. Nests about the first of June.

660 Larus glaucus *Brünn.* GLAUCOUS GULL.

Observed throughout the river region in varying abundance; principally, however, along the lower portion.

662. Larus glaucescens *Licht.* GLAUCOUS-WINGED GULL.

In the same localities, but rather more abundant than the preceding species. Nests along the river early in July.

675. Larus philadelphiæ (*Ord.*), *Gray.* BONAPARTE'S GULL.

Noted on several occasions near the mouth of the Noätak; not abundant, but undoubtedly a regular migrant to this section.

687. Sterna macrura *Naum.* ARCTIC TERN.

A very abundant species along the river, and nesting wherever found.

698. Stercorarius crepidatus (*Banks.*), *Vieill.* RICHARDSON'S JÆGER.

Not abundant in any section, but undoubtedly a migrant to the far north.

699. Stercorarius parasiticus (*Linn.*), *Saunders.* LONG-TAILED JÆGER.

Observed singly or in pairs everywhere along the river. A regular resident, but not an abundant species.

737. Colymbus Adamsi *Gray.* GREAT WHITE-BILLED LOON.

Several specimens of this beautiful diver were noted on the lower river, where they are regular summer residents; not abundant.

738. Colymbus arcticus *Linn.* BLACK-THROATED DIVER.

A moderately abundant species, confined to the marshes and lakes lying off the main river.

SAMUEL B. McLENEGAN, U. S. R. M.,
Second Assistant Engineer, U. S. S. Corwin.

NOTES

ON THE

NATURAL HISTORY AND ETHNOLOGY

OF

NORTHERN ALASKA.

BY

CHARLES H. TOWNSEND.

INTRODUCTORY LETTER.

I was taken on board the United States steamer *Corwin* at St. Paul's Island, Bering Sea, on June 21, 1885, and twelve days later (on July 2) was landed at Kotzebue Sound with a party in charge of Lieut. J. C. Cantwell, to explore the Kowak River, which is immediately north of and almost parallel with the Arctic circle in Northern Alaska.

I had been at St. Paul's nearly three weeks, having been sent to Alaska by the United States Commissioner of Fisheries to gather certain data respecting seals, cetaceans, the fisheries, &c., which I reserve for publication elsewhere. I had arrived there by the Alaska Commercial Company's steamer *St. Paul*. The opportunity of accompanying the *Corwin*, afforded through the courtesy of Captain Healy, was one which I gladly availed myself of, as it enabled me to visit a remote and usually inaccessible region.

The *Corwin* called at St. Michael's, Golovin Bay, Port Clarence, and Cape Prince of Wales on her way to the Arctic, and laboriously pushed her way for many hours through drift-ice to enter Kotzebue Sound.

Our party, consisting of Lieutenant Cantwell, William Marsh, and Frederic Lewis, seamen from the *Corwin*, myself, and Myninck, the interpreter, remained on the Kowak River nearly two months—from July 2 until August 25—during which time I obtained as many zoological specimens as our limited facilities and peculiar surroundings permitted. The object of the trip—the exploration and discovery of the source of the river—was accomplished.

Returning southward in the fall, in addition to calling again at those places visited on the northward trip, the vessel made stops at Schismareff Inlet, in the Arctic Ocean, and at Hall's Island, in Bering Sea, at all of which natural history specimens were obtained in greater or less numbers.

The *Corwin* landed me at St. Paul's Island on September 10, where I remained a month before taking the homeward-bound vessel of the Alaska Commercial Company. A delay of nearly two weeks at Ounalaska was productive of much interesting ornithological material. The steamer *Dora* arrived at San Francisco on November 8.

I must express my indebtedness to the Alaska Commercial Company of San Francisco, and to Capt. M. A. Healy, United States Revenue Marine, for the facilities I enjoyed in my work in Alaska. I received courteous treatment at the hands of the officers and agents of the company, as well as the officers of the *Corwin*. Lieutenant Cantwell was always ready to aid me while on the Kowak River. Mr. Ridgway, of the Smithsonian Institution, kindly gave me the beautiful plate representing *Plectrophenax hyperboreus*. Mr. L. M. Turner revised my spelling of Eskimo bird names according to the rules laid down in Professor Powell's Guide to the Study of Indian Languages; and Dr. George Vasey, botanist at the Department of Agriculture, identified the few plants that I was able to collect.

A collection of flowering plants obtained on the Noätak River by Mr. McLenegan, and on the Kowak by Mr. Cantwell and myself, has been mislaid or lost, as it never reached Washington. Mr. McLenegan kindly gave me some notes on birds collected by him on the Lower Kowak in 1884, but I have not used them, having decided to let the present paper stand as a record of personal observations and collections.

CHARLES H. TOWNSEND,
Assistant, United States Fish Commission.

SMITHSONIAN INSTITUTION, *June 25*, 1886.

NATURAL HISTORY AND ETHNOLOGY OF NORTHERN ALASKA.

THE KOWAK RIVER REGION.

It is a good Arctic day's journey in a steam-launch up Hotham Inlet to the Kowak mouth, for there is scarcely more than an hour's darkness at the beginning of July, and as the waves run pretty high when the wind blows, the heavily loaded launch hugs the windward shore for safety. Plenty of water birds are met with along here. Surf ducks, loons, white-fronted and white-cheeked geese keep swimming out of the way of the boats, and a few *Tringæ* run along shore or keep just ahead by short flights.

This west shore consists of narrow beach, behind which rises an irregular line of low bluffs that shut off the view of the treeless tundra peninsula separating the inlet from Kotzebue Sound. An occasional raven's croak calls attention to his black form perched upon a bank, and the osprey or some other hawk frequently announces its presence by some falconine call as it passes. The bushes clinging to the bluffs harbor a few white-crown and savanna sparrows, and some ptarmigan, in mottled summer plumage, may be flushed from among the whortleberry bushes (*Vaccinium*) growing amid the sphagnum of the tundra. A few mice (*Arvicola*) are found in the drier situations.

In the delta of the river a stray kingfisher or an anxious goose, hurrying her brood of half-grown young under the overhanging willow verdure of the banks for concealment, are about the only signs of life, for the channels are narrow and the view is shut off completely. Polar hares are met with along here. Farther up the scattered spruces (*Abies*) come in sight to vary the monotony, or a widening out of "the river's wooded reaches" affords a glimpse of some distant rocky-topped elevation which, by reason of the meanderings of the stream through the lowlands, shows alternately to port and starboard.

Above the many-channeled delta the Kowak assumes a different character. High banks of old ice and clay appear, bearing a thin coat of surface soil, which supports the stunted Arctic growth of white spruce. The banks, undermined by the melting of their ancient icy substratum, often slide in massive sections into the river, carrying a wide margin of forest with them. In many places navigation is impeded by earth-anchored spruce snags. Sometimes cavernous holes are excavated as the gritty ice disappears, and the overarching mass of earth hangs ready to fall when a few more hours exposure to the incessant Arctic sunshine shall have set it free. These banks are too icy to be tunneled by kingfishers or bank swallows, consequently such birds are scarce along the lower river.

There are many extensive sand-bars in the Kowak above the delta, where cranes, a few gulls and tĕrns, and some least sandpipers and semi-palmated plovers congregate to feed and sun themselves. Bears and the smaller fur-bearing animals leave many tracks here, and on the sand-bars further up we saw reindeer tracks. An occasional spruce along shore is topped with the bulky nest of the fish-hawk.

Although spruce forest exists to a greater or less extent in all parts of the Kowak River region, there is no regularity about its distribution; a hundred miles or more above salt water, where the river runs near the hills, the forest is quite heavy, but where the course is through level country the river is bordered by mossy tundra plains, usually treeless.

Excellent whortleberries grow in all parts of the country, and are eaten greedily by wild geese and cranes as well as all the smaller birds. I suspected the robins and varied thrushes of eating the currants which grew plentifully in all thickets near the river. Flowers of beau-

tiful tints were found springing everywhere, as though they expected the midnight sun to shine on them forever, and had lost all memory of the snow and darkness of the northern winter.

Some of the commonest plants and flowers of the Kowak in July and August are:

Aconitum Napellus, L.
Nasturtium palustre, D. C.
Poterium Sitchense, S. W.
Saxifraga Hirculus, L.
Saxifraga leucanthemifolia var. *Brunoniana*, T. & G.
Epilobium spicatum, Lam.
Galium boreale, L.
Myosotis sylvatica, Hoff.
Allium Schœnoprasum, L.
Juncus stygius, L.
Carex Mertinsii, Presc.
Aspidium fragrans, Swartz.
Hedysarum boreale, Nutt.
Rubus arcticus, L.
Achillea Millefolium, L.

But some that were in bloom when we first entered the river were replaced by others later in the season.

The Northwestern Eskimo, or Innuits, although chiefly a coast people, live also on the rivers of the region. On the Kowak their camps and habitations are scattered irregularly along the lower two-thirds of its course, but in summer hunting parties range up to its very headwaters. The pursuit of the reindeer sometimes leads hunters far inland; in fact, the majority of the abler-bodied men appear to spend the short summer in the pursuit of game in the interior, while the youths, children, and old men remain on the lower river with the women, whose duty it is to gather in the ichthyological harvest afforded by the annual salmon run. They often make temporary camps well up stream, where there are suitable seining grounds, but their earth-covered winter houses are usually at no great distance from the sea. Winter houses or "iglus" are constructed of spruce saplings set upright in the ground close together, in the form of a square, four posts supporting the arched roof, which is also of light saplings. A hole in the top serves for chimney and ventilator. The entire structure is covered with earth, and when deserted for a year or two, and overgrown with grass and mosses, looks like a mound, identified as having been a human habitation only by some tumble-down fish-racks on the river bank near by, or the withered form of a raven stuck upon a pole.

There is an abundant supply of food-fishes in the Kowak region, salmon, trout, grayling, pike, and whitefish being the commonest species. The natives take them in seines, which are made by the women from fibers of roots gathered along the river banks wherever they are exposed by the breaking away of the earth. These seines, which are usually not more than a yard in width and vary in length from thirty to fifty feet, are strong and durable, but would not hold a very heavy haul of salmon. They are fitted with wooden floats, the sinkers being made of reindeer horn. In seining, which is always done in shallow water, one end is carried along shore by the children, the squaws towing the other end down stream in a large birch canoe or a seal-skin boat, keeping it out as far as the length of the seine permits. Large numbers of salmon are taken in this way, and after being split open, are dried upon poles in the sunshine, a food supply against that time when "Mighty Peboan, the Winter," shall seal up the friendly river, drive off the wild fowl, and cover over "all the Northland" with his mantles of snow and darkness.

I expected to find the snowy owl and the hawk-owl on the Kowak, but saw nothing of them, although I kept a bright lookout.

There are several other species rather widely distributed northward, such as the ouzel, downy woodpecker, flicker, pine grosbeak, crossbill, &c., that might be expected as stragglers, but were not met with.

There are high ranges of hills between this region and the Yukon over which migrating birds doubtless have to pass. As the following pages show, some of the commonest birds of the United States breed regularly in this remote and desolate region. It is comforting to find robins, whitecrown sparrows, bank-swallows, kingfishers, and other well-known and dearly loved home birds following one's meanderings even beyond the Arctic Circle. It inspires thoughts of home and creates a warmth at the heart.

Zoological collecting is not easy work in a country such as that drained by the Kowak River. We traveled in a small steam-launch, heavily loaded, with a boat full of natives and

supplies in tow, so that very extensive collections could not be transported. There was much rainy weather, making it difficult to collect as well as to dry bird-skins, and the mosquito plague was always a serious drawback in fair weather unless there was a breeze blowing to lessen the force of the attack. We welcomed the occasional chilly days that gave us respite from mosquito persecution. Otherwise we were compelled to wear a coating of tar and carbolized oil on our faces and hands for days together, until the feverish and smarting skin demanded its removal. Daily ablutions under such circumstances could not of course be indulged in.

Prolonged rambles back from the river are impracticable, on account of the exhausting labor of tramping through the hummocks and moss of the tundra, or frozen morass. The sphagnum tundra growth is omnipresent, extending even up on the mountains, and forms a heavy covering for the ice which is everywhere beneath it. Moss-covered hummocks stand so close as to present a false level—a "spongy flush," as John Muir describes it—through which one is constantly breaking, frequently sinking thigh deep in the icy water underneath, of which the flower-dotted surface gives no indication.

In addition to these "slight drawbacks" in the way of natural history collecting in Alaska, one finds that fragile specimens have a perverse way of getting trodden upon in the boats, and the Bacchanalian native exhibits betimes an untoward desire to use the alcohol in the fish-tank as a beverage, from which he must needs be restrained, lest the ichthyological specimens be stinted, to their detriment. Indeed, at St. Paul's Island, one night in September, a couple of Aleuts broke into the building where my alcohol was kept, for the purpose of stealing some, and accidentally set fire to it. In their efforts to put out the fire their hands were frightfully burned. This loss compelled me to put my specimens on short allowance, and to collect with discrimination during the rest of the season.

It is, however, quite unnecessary for me to write further of the general features of the Kowak country, as Lieutenant Cantwell discusses the subject very fully in his narrative of the voyage.

MAMMALS.

Rangifer tarandus grœnlandicus (*Kerr*). REINDEER.

Reindeer skin appears to be the principal material used for clothing by the natives of the Kowak River region, but judging from the number of "piebald" garments we saw, the stock is derived chiefly from the domesticated variety, which is herded in great numbers on the Asiatic side of Bering Straits, and obtained by means of exchanges carried on in summer. The wild Alaskan variety of a reindeer is probably not very numerous in the Kowak region, although Mr. Cantwell saw a few small herds among the hills at the headwaters of the river, to which they migrate in summer. It is not improbable that they seek the higher lands to escape the mosquito plague that makes life miserable for beast as well as man in the tundra sections. We saw a few fresh tracks in the sand of the lower river in July. On August 1, I saw a reindeer with horns still in the velvet. I was hunting with a light shot-gun among some hills several miles from the river and paused for a rest, when a reindeer approached through the dense mist and inspected me at a distance of less than forty yards. I remained perfectly quiet, sitting among the low bushes, while the excited animal played all around me. He would become frightened at times and dash away to a slight eminence near by, from which he snorted at me in great alarm; but overcome by curiosity, he approached repeatedly for a nearer view.

At the end of half an hour, when the mist had turned to rain, I left him, still watching me from a safe distance, and went away and meditating on the perversity with which game appears when one has the wrong kind of arms or none at all.

This deer was not large, in fact not nearly as large as I expected to find an adult reindeer with fully developed antlers. The hides which we saw in possession of the people did not apparently indicate as large an animal as the Californian *Cariacus columbianus*, so that it is probable that the small barren-ground reindeer, or caribou, is the only variety found in North

Alaska. The larger woodland caribou is doubtless the prevailing variety to the southward. Reindeer are found more or less regularly throughout Alaska. They were found by Mr. McLenegan on the Noätak, as well as by our party on the Kowak. Traders in the service of the Alaska Commercial Company told me of their common distribution over the Yukon, Kuskokvim, and Aleutian divisions of the country. They have even been shot on Ounimak Island, at the end of the peninsula. But reindeer are restless animals, irregular in their migrations and habits. Sometimes they desert whole sections of country for months together, and they appear to have withdrawn from many regions where fire-arms have been introduced.

Notwithstanding the fact that large herds of reindeer are kept in a state of domestication by the Chukchees, at East Cape, and other well-known places on the Asiatic side of Bering Straits, with whom the natives of the Alaskan side communicate regularly, there appears to be no domestication of the species whatever in Alaska, nor, indeed, in any part of North America.

In time, when the general use of fire-arms by the natives of Upper Alaska shall have reduced the numbers of this wary animal, the introduction of the tame variety, which is a substantial support to the people just across the Straits, among our own thriftless, alcohol-bewitched Eskimos, would be a philanthropic movement, contributing more toward their amelioration than any system of schools or kindred charities. The native boats could never accomplish the importation, which would, however, present no difficulty to ordinary sea-going vessels. The taming of the American reindeer is impracticable, for domestication, with this animal at least, is the result of subjection through many generations. Something tending to render a wild people pastoral or agricultural ought to be the first step toward their advancement. In our management of these people, *purchased from the Russians*, we have an opportunity to atone, in a measure, for a century of dishonorable treatment of the Indian.

Ovis canadensis (*Shaw*). BIGHORN.

I saw a skin of the mountain sheep in the possession of a native on the lower river, and saw several spoons made from its horns. The natives told us of its existence in the high hills inland.

Sciurus hudsonius (*Pallas*). RED SQUIRREL (*Ca-ka-la-tai-ûk*).

We found red squirrels not uncommon in the spruce forests of the Upper Kowak. They were comparatively familiar, and sometimes chatted noisily in the trees about our camps.

Five specimens; Upper Kowak, July 26–30.

Castor fiber *Linné*. BEAVER.

Beaver skins were not plentiful among the natives, but we saw pelts occasionally that had doubtless been taken in that region, as many of them were from young animals.

Fiber zibethicus (*Linné*). MUSKRATS.

I saw two live muskrats swimming in the river, just about the delta, on August 22, and fired at them, but without effect. I was impressed with the fact of their small size, although they appeared to be adults. The same is true of the pelts we saw in the possession of the natives, and of which they make garments and blankets.

Myodesobensis *Brants*. LEMMING.

A single specimen of the common lemming was obtained on the river.

Arvicola riparius (*Ord.*).

We obtained specimens of this mouse in certain deserted winter houses of the natives along the lower river, and in a mossy bank near our camp at Kotzebue Sound.

Erethizon dorsatus epixanthus (*Brandt*). WESTERN PORCUPINE.

Mr. Cantwell obtained three or four young porcupines near the source of the river in July, which were roasted and eaten by the natives accompanying him. The species was not met with elsewhere.

One specimen (young); headwaters of Kowak, July.

Lepus timidus *Linné*. POLAR HARE.

On July 4 I saw a solitary hare in the Kowak delta, the only one seen during our explorations. I do not remember having seen any skins in the villages along the river, although they were sometimes seen in the possession of the coast people.

Sorex sp.

I saw a diminutive shrew on August 22, not far above the delta of the river. It was the only one observed in the country.

Phoca vitulina *Linné*. HARBOR SEAL.

The harbor seal, which is abundant all along the northern coasts, and which is constantly hunted by the people for food and clothing, often wanders far up the Kowak River.

Ursus richardsoni *Aud. and Bach*. BARREN-GROUND BEAR.

The brown and yellowish bear skins in the possession of the natives should probably all be referred to this variety. Bear tracks were often found in the sand-bars along the river; none of them appeared to indicate animals of very great size.

Gulo luscus (*Linné*). WOLVERINE.

I only saw two or three skins of this animal. They are frequently worn by the natives, but the majority of them are obtained, I think, for other localities.

Putorius vison (*Schreber*). MINK.

saw a mink on the upper river August 1. Pelts were to be found in all the villages.

Putorius erminea (*Linné*). ERMINE.

Skins of this animal were very common among the natives, and the inference is that they were taken on the river, as the species is abundant in Northern Alaska.

Vulpes fulvus (*Desm.*). RED FOX.

Skins of this and the next species were often seen.

Vulpes lagopus (*Linné*). ARCTIC FOX.

Elephas.

Tusks, teeth, and bones of the mammoth were seen in many of the villages on the Kowak River. The natives frequently carve ornaments and useful articles out of mammoth tusks, and I saw some very large soup-ladles made out of this fossil ivory. At Cape Prince of Wales, where the *Corwin* anchored for a short time on her way north, several tusks and large bones of the mammoth were brought aboard for barter. When questioned as to their ideas respecting this great extinct elephant, the natives told us that it was a very large reindeer, and pointed out to us, from the size of the bones lying on the deck, how large it must have been. I brought out a copy of Le Conte's Geology, which we had on board, and showed them a picture of the skeleton of a mammoth, which they recognized at once, and delightedly pointed out the bones resembling those lying upon the deck. When I produced a picture of the same animal restored, in which it greatly resembles the elephant, their enthusiasm reached a high pitch.

The matter was apparently perfectly clear to their minds, and they listened with attention while the surgeon and I explained, through the interpreter, what we knew about the mammoth. Before the book was put away one of them borrowed a pencil and piece of paper to copy the outlines of the picture, and I am bound to say that his sketch was very creditable, considering the crude ideas of art among such people.

On August 28, at Schismareff Inlet, I found the front half of the skull of a mammoth lying on the open tundra, which was not fossilized in the least, being simply a mass of dry bone, firm and light. This is rather remarkable, considering the long extinction of the mammoth and the geological and climatic changes which have since taken place in North America.

BIRDS.*

1. Urinator imber (*Gunn.*). LOON (*Kha-a-drŭk*).

Loons were seen almost daily by our party while on the Kowak River. As no specimens of the dark-necked kinds were obtained, I am not certain that *U. arcticus* and *pacificus* were not represented there as well as *imber*.

2. Urinator adamsii (*Gray*). YELLOW-BILLED LOON.

Among the loons which flew noisily over our boats from time to time I occasionally recognized this species.

3. Urinator lumme (*Gunn.*). RED-THROATED LOON (*Kah a-drŭk*).

I obtained a specimen of this bird on the upper river on August 10. Although I saw neither nests nor young birds, the constant presence on the river of this and the two preceding species would seem to indicate their breeding there.

4. Larus glaucus *Brünn.* GLAUCUS GULL.

Glaucus gulls were frequently seen during our voyage, especially along the lower river, where we observed them sometimes resting upon the swaying tops of the spruce trees, a very unusual thing for gulls to do.

Two specimens (skeletons); Lower Kowak, August 25.

5. Larus glaucescens *Naum.* GLAUCUS-WINGED GULL.

The presence of this species was noted almost daily until we reached a distance of about three hundred miles from the sea, when it became rather scarce.

6. Larus philadelphia (*Ord*). BONAPARTE'S GULL (*A-khâi-di-gŭg-gûk*).

I obtained specimens of this bird on the middle and lower river in July. It was not often seen.

Two specimens; Lower and Middle Kowak, July 4–10.

7. Sterna paradisæa *Brünn.* ARCTIC TERN (*Mi-ko-tâi-lûk*).

The Arctic tern is a common bird all along the river.

Two specimens; Lower Kowak, July 4–August 18.

8. Merganser serrator (*Linn.*). RED-BREASTED MERGANSER (*Pai-cŭ-gu-ruk*).

A moderately common summer resident. Young birds in the down were shot August 10.

Three specimens; Lower Kowak, August 18.

9. Anas americana *Gmel.* BALD-PATE (*U-gire-hewĭk*).

Common in the lagoons along the middle and lower river. We shot many full-grown young birds late in August.

10. Anas carolinensis *Gmelin.* GREEN-WINGED TEAL.

The green-winged teal was frequently met with during our voyage. The young are well grown by the middle of August.

One specimen; Lower Kowak, August.

11. Dafila acuta (*Linn.*). PINTAIL.

More abundant than either of the two preceding species, especially at the delta of the river and about Hotham Inlet, where we shot numbers of them late in the season.

12. Oidemia americana *Sw. & Rich.* AMERICAN SCOTER (*Mi-ti-gu-ûĕ-enk*).

This species was not uncommon along the lower river.

* Nomenclature of the American Ornithologists' Union.

13. Anser albifrons gambeli (*Hartl.*). AMERICAN WHITE-FRONTED GOOSE (*Ti-gi-uk*).

This goose is a summer resident of the entire Kowak River region, and probably the most abundant of all the *Anserinæ* breeding there. We found it everywhere over the tundra lands, feeding on the blueberries. Mr. Cantwell brought me a specimen from the lake at the source of the river, where it was very abundant.

14. Branta canadensis hutchinsii (*Sw. & Rich.*). HUTCHINS'S GOOSE.

This and the following species were constantly present upon the river, and we frequently shot them from the launch as we steamed along. The large fledglings, when stuffed with potato and bits of wild onion, which we gathered along shore, furnished us many a savory roast.

15. Branta canadensis minima *Ridgw.* CACKLING GOOSE.

16. Olor columbianus (*Ord*). WHISTLING SWAN.

Swans were scarce in the region through which we traveled. Straggling individuals were sometimes seen on the shallow lakes scattered over the tundra lands.

17. Grus canadensis (*Linn.*). LITTLE BROWN CRANE.

This small crane, which is dispersed in moderate numbers throughout the country, is such a diminutive bird that I hardly recognized it as an American species. It seemed not more than one-third the size of the *Grus* I had become familiar with in the Western States. Now known to be a distinct species, it is strange that it should have been so long confused with larger birds. There is probably room for doubt as to its wintering-place being the borders of Mexico.

18. Tringa minutilla (*Vieill.*) LEAST SANDPIPER (*Ca-uăk*).

I procured five specimens of the least sandpiper on the upper course of the river July 20–25. It was not uncommon later in the season.

19. Ereunetes pusillus (*Linn.*). SEMIPALMATED SANDPIPER (*I-lĭp-kak*).

A single specimen was shot on July 20, from a flock of the preceding species.

20. Totanus flavipes (*Gmel.*). YELLOW-LEGS (*Pu-bi-ăk-tuk*).

The yellow-legs breeds sparingly in marshy thickets bordering the river. It is very noisy when its retreats are invaded, flying excitedly over the low spruces or resting upon their tops.

One specimen; Lower Kowak, July 4.

21. Bartramia longicauda (*Bechst.*). BARTRAMIAN SANDPIPER (*Ŭ-li-cim*).

Only seen on two or three occasions.

One specimen; Upper Kowak, July 15.

22. Actitis macularia (*Linn.*). SPOTTED SANDPIPER (*I-căi-kok-cŭñ-i-dŭ-rok* or *Á-mo-tlli-yûk*).

Rare. One specimen; Upper Kowak, July 24.

23. Numenius tahitiensis (*Gmel.*). BRISTLE-THIGHED CURLEW (*Tu-răi-tu-rok*).

I shot a specimen of *N. tahitiensis* at Kotzebue Sound, August 26, 1885, having flushed it from among the blueberry bushes where it was feeding. The occurrence of this inhabitant of the South Pacific Islands is thus recorded for the third time in North America, it having been taken at Fort Kenai, Alaska, by Mr. Bischoff, May 16, 1869, and at St. Michael's, Alaska, by Mr. Nelson, May 24, 1880. From the fact of this being a young bird taken in the autumn, it is probable that the species sometimes breeds in Alaska. It is not recorded as occurring on the Asiatic side.

24. Ægialitis semipalmata *Bonp.* SEMIPALMATED PLOVER (*Kŭ-ruk-ŭ-ruk*).

Not uncommon about the sand-bars of the river.

Two specimens; Upper Kowak, July 8–24.

25. Arenaria melanocephala (*Vig.*). BLACK TURNSTONE (*Tú-gua-ti-luk*).

Seen occasionally about the mouth of the river and Hotham Inlet.

One specimen; Kowak delta, July 4.

26. Dendragapus canadensis (*Linn.*). CANADA GROUSE (*Ná-va-ti-mû-i-gĕ*).

A single specimen of this species, a female accompanied by fledglings, was obtained in the spruce woods on the middle Kowak July 11. No others were seen.

27. Lagopus lagopus (*Linn.*). WILLOW PTARMIGAN (*A-ká-di-gi-wûk*).

We found a few flocks of this bird along the lower river and about Kotzebue Sound in August, only one individual having been seen higher up. They were always met with on the open tundra, feeding on the omnipresent blueberries.

Two specimens; Upper Kowak July 14, and Kotzebue Sound August 26.

28. Circus hudsonius (*Linn.*). MARSH HAWK (*Po-pĭk-tŏk*).

The marsh hawk is a common species throughout the Kowak River region, where its breeding is indicated by the young birds collected.

Three specimens; Upper Kowak, August 10, and Kotzebue Sound, August 26.

29. Archibuteo ferrugineus (*Licht.*). FERRUGINOUS ROUGH-LEG (*Khaí-lú-ruk*).

Large hawks, chiefly, I think, of this species, were often seen along the river.

One specimen; Lower Kowak, August 22.

30. Falco columbarius (*Linn.*). PIGEON-HAWK (*Kĭ-di-go-wé-tcûk*).

Rather common everywhere during our stay in the region. Breeds in the wooded districts.

Three specimens; Upper Kowak, July 12, August 10–18.

31. Pandion haliaëtus carolinensis (*Gmel.*). AMERICAN OSPREY (*Ká-lûk-a-cú-rûk*).

A common species, especially along the lower river, where many nests were seen upon the tops of the spruces. I took a full-grown young bird from one of these nests, which traveled with us during the remainder of the season, perched upon the bow of the steam-launch. The appetite of this bird was always good, which could not be said of its temper, its piscivorous propensities fully justifying its native name of Ká-lûk-a-cú-rûk, which Myninck explained meant "eat um plenty feesh." Fortunately, we always had plenty of "feesh" for both the osprey and Myninck to eat, the latter being quite as deserving of some such ichthyophagous distinction.

23. Asio accipitrinus (*Pall.*). SHORT-EARED OWL (*Ni-pal-yúk-tok*).

One specimen; Kotzebue Sound, August 26. This was the only individual owl of any kind that I saw in the region.

33. Ceryle alcyon (*Linn.*). BELTED KINGFISHER (*Nú-ki-tcûk-ûk* or *Tu-yú-yu-gú-luk*).

The kingfisher was present upon the river during the entire season; in fact, it was as common as one would expect to find it on a river in the United States. I found a nest on July 24, in the usual situation—in a hole tunneled in a soft bank.

Four specimens; Upper and Middle Kowak, July 25–August 18.

34. Perisoreus canadensis fumifrons *Ridgw.* ALASKA JAY (*Kĭ-ruk* or *Aí-dáe-di-yŏk*).

A common species in the spruce woods of the region. I shot many of them about the villages of the natives, where they gathered to feed on the dried fish that the people were curing on racks in the open air for winter stores. Salmon eggs, often dried with the fish, were their delight. They came noiselessly, like the thieves they were, from apparently nowhere, and dropped singly and by turn upon the racks, with a mischievous flirt of the tail, to snatch the mouthful of roe they made off with.

Twelve specimens; Upper and Middle Kowak, July 11–August 18.

35. Corvus corax sinuatus (*Wagl.*). AMERICAN RAVEN.

Rather common along the river. Seen also at Kotzebue Sound.

Two specimens (skeletons); Lower Kowak, August 25.

36. Scolecophagus carolinus (*Müll.*). RUSTY BLACKBIRD (*Tú-lu-gú-ruk*).

I saw nothing of this bird until late in the season, when a few migrants, from the north presumably, were noticed about the banks of the lower river and at Kotzebue Sound.

Two specimens; Lower Kowak, August 22–25.

37. Acanthis linaria holbœllii (*Brehm*). HOLBŒLL'S REDPOLL (*Ka-brûk-twa-yuk*).

The redpolls probably breed near the coast in Northern Alaska, for during a two-months' journey of several hundred miles through a well-diversified country I saw less than half a dozen individuals, and there were no evidences that these were breeding.

Two specimens; Upper Kowak, July 15.

38. Calcarius lapponicus (*Linn.*). LAPLAND LONGSPUR (*Ko-pál-yuk*).

I found this species comparatively abundant about Kotzebue Sound late in August, but saw nothing of it up the river.

One specimen; Kotzebue Sound, August 26.

39. Ammodramus sandwichensis alaudinus (*Bonap.*). WESTERN SAVANNA SPARROW (*O-pál-yuk.*)

The savanna sparrow is a very abundant bird along the river. I did not find nests, but the number of young birds shot indicate that the species breeds plentifully there.

Six specimens; Upper Kowak, July 20–August 10.

40. Zonotrichia intermedia *Ridgw.* INTERMEDIATE SPARROW (*Núñ-wuk-tân-ruk*).

This is probably the most abundant sparrow in the Kowak regions. I found many young birds.

Thirteen specimens; Upper and Middle Kowak, July 7–August 18.

41. Spizella monticola ochracea *Brewst.* WESTERN TREE SPARROW (*Cuk-cán-ruk* or *Čk-pík-shdi-uk* or *Mic-ok-tâi-yuk.*)

Constantly associated with the two preceding species, it was almost as common both in the number of adults and young.

Thirteen specimens; Upper and Middle Kowak, July 15–August 18.

42. Junco hyemalis (*Linn.*). SLATE-COLORED SPARROW (*Ka-zú-nu-tûk*).

Moderately common in the drier spruce forests.

Three specimens; Upper Kowak, July 20–24.

43. Melospiza lincolni (*Aud.*). LINCOLN'S SPARROW (*Síl-wiñ-mĕk-cûk*).

A solitary specimen of Lincoln's sparrow was shot on the Upper Kowak, July 20.

44. Passerella iliaca (*Merr.*). FOX SPARROW.

Like the preceding, this species is represented in my collection by a single specimen, the only one seen. It was taken on the upper river on July 15.

45. Chelidon erythrogaster (*Bodd.*). BARN SWALLOW.

I recognized the barn swallow on several occasions as it flew with other swallows over the river.

46. Clivicola riparia (*Linn.*). BANK SWALLOW.

Bank swallows were frequently seen on the upper river when we first arrived there, but later the continued heavy rains raised the river to such a height (nearly ten feet) that their tunnels were inundated and the young birds destroyed. For a week or more after this, or during the first week of August, large flocks of swallows went flying everywhere about the country and then disappeared and were seen no more during our stay on the river.

47. Lanius borealis *Vieill.* NORTHERN SHRIKE.

The only shrike seen was a young bird I shot at Kotzebue Sound August 26.

48. Dendroica æstiva (*Gmel.*). YELLOW WARBLER.

Apparently not common anywhere in the region. A few young birds were seen about the beginning of August.

One specimen; Middle Kowak, August 10.

49. Dendroica coronata (*Linn.*). MYRTLE WARBLER (*Tai-teiñ-i-ruk*).

My specimens of this species, which was found in moderate numbers along the river, are both young birds.

Two specimens; Upper and Middle Kowak, July 25–August 15.

50. Dendroica striata (*Forst.*). BLACK-POLL WARBLER.

Like the preceding, only moderately common. Young birds collected.

Four specimens; Upper and Middle Kowak, July 22–August 15.

51. Seiurus noveboracensis (*Gmel.*). WATER THRUSH (*Íks-lĭk-tái-ûk*).

Seen on several occasions in damp thickets along the river. Three specimens; Upper Kowak, July 12–August 8.

52. Sylvania pusilla (*Wils.*). WILSON'S WARBLER (*Náñ-wak-tú-ruk*).

Probably commoner than any other warbler in the region. Six specimens; Upper and Middle Kowak, July 8–August 15.

53. Anthus pensilvanicus (*Lath.*). AMERICAN PIPIT (*I-vĭk-cuk*).

Small bands of this species constantly frequented the higher and drier hilltops. They never descended to the damp tundra bordering the river. Three specimens; Middle Kowak, August 1–18.

54. Parus hudsonicus *Forst.* HUDSONIAN CHICKADEE.

I met with the chickadee on one occasion only, a single individual having been shot on the upper river July 24.

55. Phyllopseustes borealis (*Blas.*). KENNICOTT'S WILLOW WARBLER.

I procured a specimen of the rare Kennicott's warbler on August 1. It was discovered in a thicket far up on one of the highest hills of the middle river, and was singing sweetly.

On August 30 I obtained another specimen at Port Clarence under similar circumstances, which was unfortunately lost. It is a Siberian bird, known in Alaska by less than half a dozen specimens.

56. Turdus aliciæ *Baird.* GRAY-CHEEKED THRUSH (*Siñ-ut-lú-luk* or *Íks-lĭk-tái-ûk.*)

Common among the thickets of the lower river. It will be noticed that the native who gave me the name of *Íks-lĭk-tái-ûk* for this species confounded it with the water thrush (*Seiurus noveboracensis*), which perhaps resembles it sufficiently to make his mistake excusable.

Five specimens; Lower Kowak, July 4 and August 18.

57. Merula migratoria (*Linn.*). AMERICAN ROBIN (*Kún-a-yú-ruk*, adult; *cúk-cái-tca-cú-luk*, young).

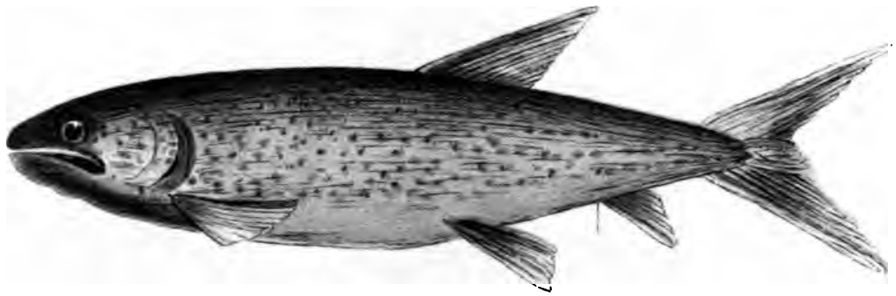
A common summer resident.

Five specimens; Upper Kowak, July 24–29.

58. Hesperocichla nævia (*Gmel.*). VARIED THRUSH (*Tiñ-mi-ni-luk* or *Ci-o-lĭk-tú-drok*).

A species whose presence was noted at intervals during the entire season. I found a nest containing three hard-set eggs on July 4, in the spruce woods of the lower river.

Eight specimens; July 4 and August 18.



1 Foot

LAKE COR-LAC-AH-LOOK-TAK TROUT

CORWIN 1885

FISHES.

CATOSTOMIDÆ.

Catostomus longirostris *Le Seuer.* NORTHERN SUCKER.

On July 24 I obtained several fishes of this species by dragging a small seine, with Marsh's help, through an old high-water channel, in which the fishes had been cut off by the falling of the river. These were all fine large fishes, of excellent flavor. Although plentiful in this old channel, they were seldom seen elsewhere. The reason of this may have been that the root-fiber nets used by the natives in catching salmon were not well adapted to the capture of bottom fishes, such as suckers.

Two specimens; Upper Kowak, July 24.

SALMONIDÆ.

Coregonus quadrilateralis *Richardson.* WHITEFISH.

Frequently taken in the salmon seines.

One specimen; Middle Kowak, August.

Coregonus kennicotti *Milner.*

Not very common. Those seen were of large size, being sometimes as long as adult salmon.

One specimen; Middle Kowak, August.

Coregonus nelsoni *Bean.*

One specimen; Middle Kowak, August.

Coregonus neerki, var. Günther.

One specimen; Middle Kowak, August.

Thymallus signifer *Richardson.* AMERICAN GRAYLING.

A very abundant species in all fresh waters of the region. Often netted in large numbers by the natives.

One specimen; Upper Kowak, July.

Stenodus mackenziei *Richardson.*

One specimen; Middle Kowak, August.

Oncorhynchus gorbuscha *Walbaum.* HUMPBACK SALMON.

Probably not more than half a dozen individuals of this species were seen during our voyaging on the river, although large numbers of fishes were examined at every village of the natives.

One specimen; Middle Kowak, August 1.

Oncorhynchus keta *Walbaum.* DOG SALMON.

The prevailing salmon in the Kowak. Great numbers dried by the people.

Salvelinus namaycush *Walbaum.* GREAT LAKE TROUT.

Mr. Cantwell brought me a large specimen of this magnificent trout from the lake in which the Kowak heads, where he found it in abundance. The lake is called Car-loog-ah-look-tah by the natives, in reference to the great size of the trout inhabiting it. The species was not met with elsewhere.

Salvelinus malma *Walbaum.* RED-SPOTTED TROUT.

Common in the Kowak. Found also at Ounalaska.

Three specimens; Upper Kowak, July; Ounalaska, October.

ESOCIDÆ.

Esox lucius *Linnæus.* PIKE.

Abundant in all parts of the Kowak. These fishes were most numerous in the lagoons leading off from the river, lurking in the shallowest water among the mosses, from which we constantly startled them in walking along shore. We shot numbers of them as they lay in the mosses with barely enough water to cover them. It is possible that they were spawning there.

Two specimens; Middle Kowak, August.

PLEURONECTIDÆ.

Limanda aspera *Pallas.*

This species was found in limited numbers in August among the piles of fish at the native fishing-grounds at Kotzebue Sound. It was not seen when we passed there the first of July.

Three specimens; Kotzebue Sound, August 26.

Pleuronectes stellatus *Pallas.* "FLOUNDER."

Tolerably abundant at Kotzebue Sound early in July.

Two specimens; Kotzebue Sound, July 3.

NOTES ON MAMMALS, BIRDS, AND FISHES OBTAINED AT VARIOUS PLACES BETWEEN THE ALEUTIAN ISLANDS AND KOTZEBUE SOUND.

At Schismareff Inlet, on August 28, I saw more shore birds—curlews, plovers, godwits, snipes, &c.—than I ever saw before in one day. The long-billed snipes afforded particularly fine sport; they arose in flocks from the marshy ground everywhere, so that even the tyros were able to bag considerable numbers of them. The ponds and lakelets about Port Clarence were filled with long-tail ducks in June and with widgeon in August, while shore birds of many species were very abundant during both visits we made there. Hall's Island, however, I considered the most interesting place at which the Corwin stopped. Its hills are three thousand feet or more in height, mountains almost, which the most cursory examination shows to be old volcanoes. Their slopes are loaded with the heaviest of sphagnum vegetation. I found lovely plants springing in ravines where the last year's snow was still lying, while more favorable spots were aglow with the bright colors of flowers, whose bloom on this lonely island is unseen save by the wild creatures who make their home there. I filled my game-bag with some of the showiest ones, which have since been identified as follows:

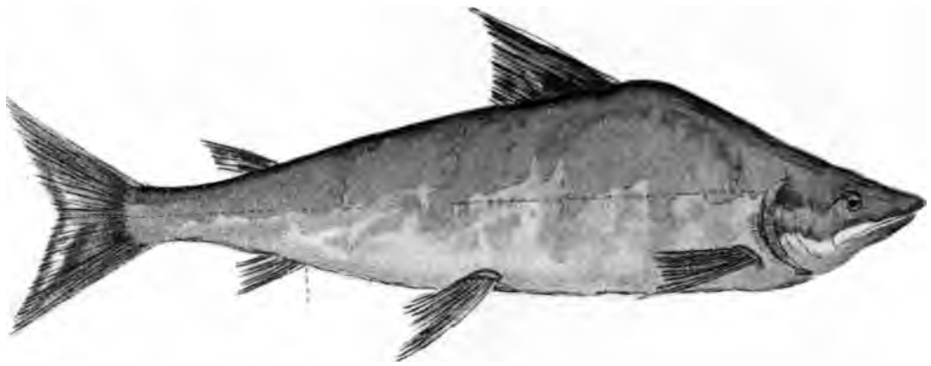
Aconitum napellus Linn.
Ranunculus canus Benth.?
Cardamine pratensis L.
Cerastium vulgatum L.
Sedum rhodiola D. C.
Valeriana capitata Willd.
Senecio resedifolius Less.
Gentiana frigida Haenke.
Polemonium pulchellum Bunge.
Pedicularis capitata Adams.
Veronica alpina L.
Polygonum viviparum L.

Polar bears are numerous.

St. Michael's is a famous place for geese in the fall. The natives brought them on board by the dozen, the assortment consisting of white-fronted, Canada, and emperor geese. A striking feature of the place is the large number of jægers (*Stercorarius*) that fly about the bay.

Having spent the greater part of the summer farther north, I did not have an opportunity of visiting the island of St. George, of the Pribyloff group, and did not pick up many specimens, except fur-seals, while at St. Paul's, the use of fire-arms being prohibited during the sealing season, and my time being taken up with the seals. A week or more spent on Otter Island was productive of many desirable ornithological specimens, one species (*Tringa damascensis*) being new to the fauna of North America.

A visit to the Farallone Islands, off the Californian coast, where there are myriads of seabirds, had prepared me only in a slight measure for the ornithological wonders of the Pribyloffs. While the steamer was passing St. George's the surface of the sea was dotted with bird



1 Foot

AMOK - TOK

CORWIN 1885

forms in all directions as far as eye could see. Long lines of flying guillemots encircled the island and bounded the horizon. All available portions of the bold bluffs were crowded with murres, auks, puffins, and other birds, whose clamor was unceasing. Birds are not nearly as numerous at St. Paul's. Otter Island, which is but little frequented by the fur-seal on account of its almost continuous shore line of bluffs, is a stronghold for the birds. We got the eggs of the fulmars by swinging over the cliffs on the end of a rope. The eggs of the murres were usually more accessible, but those of the auklets were hidden far back in narrow rock crevices, where it was impossible to get at them.

A few plants gathered incidentally on St. Paul's in September and on Ounalaska Island in October have been determined as the following species by Dr. Vasey:

ST. PAUL'S.

Ranunculus nivalis R. Br.; *Aconitum napellus* L., var. *Papaver nudicaule* L.; *Cerastium arvense* L.; *Honkenya peploides*, Erhr.; *Valeriana dioica* L.; *Taraxacum officinale* L.; *Gentiana tenella*, Rott.; *Polemonium cæruleum* L.; *Polypodium vulgare* L.; *Aspidium spinulosum* Swartz; *Aspidium lonchitis* Swartz.

OUNALASKA.

Vaccinium uliginosum L.; *Gentiana frigida* Haenke; *Polypodium vulgare* L.; *Aspidium lonchites*, Swartz.

MAMMALS.

Spermophilus empetra (*Pallas*). PARRY'S SPERMOPHILE.

Parry's Spermophile is not uncommon about Port Clarence. Its skin is very extensively used by the people of the coast for making parkas, shirt-like garments with hoods, and other clothing.

One specimen; Port Clarence, August 30.

Arvicola obscurus *Eversmann.*

In many places on Hall's Island the ground was honeycombed with the burrows of what I took to be lemmings (*Myodes*), but the only specimen obtained proves to be a mouse, although of lemming-like appearance. It is possible that the lemming also exists there

Eumetopias stelleri (*Lesson*). STELLER'S SEA-LION.

I obtained an immense male of this species in September at St. Paul's, where it is moderately common.

Callorhinus ursinus (*Linné*). NORTHERN FUR SEAL.

Gathers in countless numbers on the Pribyloff Islands during the summer season to breed. One of my specimens, a very young one, is an albino.

Nineteen specimens: St. Paul Island, June and September.

Odobænus obesus (*Ill.*). PACIFIC WALRUS.

Two or three walruses were killed by officers of the *Corwin* at Hall's Island September 8, but no specimens were saved.

Thalassarctos maritimus (*Linné*). POLAR BEAR.

Four polar bears were in sight at one time upon the side of the mountain when the *Corwin* came to anchor at Hall's Island on September 8, but they ran away at sight of our hunting party going ashore. Three of them escaped over the hills under cover of the fog, the fourth a very large one, taking refuge among the rocks, where it was finally killed, falling to my own rifle. The weight of this bear was variously estimated at from fourteen to sixteen hundred pounds. With the help of a squad of sailors Captain Healy kindly sent ashore, I was able to convert the unwieldy beast into a specimen. A considerable quantity of the meat was taken

on board and was pronounced good eating. One of the hams was sent to the Alaska Commercial Company's agent at St. Paul's Island, and steaks from it appeared regularly at his table for a week or more, and were highly appreciated by all. I mention this because it is contrary to the opinion of whalers in general, all with whom I conversed having declared the meat of the white bear unfit for food. The yellowish summer coat of this specimen was so loose that it easily rubbed off, exposing the short hair of the snowy white winter coat.

BIRDS.

Urinator adamsii (*Gray*). WHITE-BILLED LOON.

I saw a skin of the white-billed loon at the house of the United States Treasury agent on St. Paul's Island. It was killed by a native there in August, 1885.

Urinator lumme (*Gunn.*). RED-THROATED LOON.

Young birds of this species were rather common at Ounalaska in October.
One specimen; Ounalaska, October 23.

Lunda cirrhata *Pall.* TUFTED PUFFIN.

Very common about the islands of the Pribyloff group.
One specimen; Otter Island, June 14.

Fratercula corniculata (*Naum.*). HORNED PUFFIN.

Pribyloffs. Probably more numerous than the preceding.
Six specimens; Otter Island, June 8–14.

Cyclorrhynchus psittaculus (*Pall.*). PAROQUET AUKLET.

Common on the Pribyloffs.
One specimen; Otter Island, June 8.

Simorhynchus cristatellus (*Pall.*). CRESTED AUKLET.

Common on the Pribyloffs.
Three specimens; Otter Island, June 8.

Simorhynchus pusillus (*Pall.*). LEAST AUKLET.

Common on the Pribyloffs.
Eighteen specimens; St. Paul Island, June 3–12.

Cepphus columba *Pall.* PIGEON GUILLEMOT.

Only a few seen.
One specimen; Ounalaska, October 23.

Uria lomvia arra (*Pall.*). PALLAS'S MURRE.

Common on the Pribyloff Islands in summer and at Ounalaska in the fall.
Three specimens; Otter Island, June 12–14; Ounalaska, October 23.

Stercorarius pomarinus (*Temm.*). POMARINE JÆGER.

Only seen once.
One specimen; St. Paul Island, June 16.

Stercorarius longicaudus *Vieill.* LONG-TAILED JÆGER.

Common about Norton Sound and Port Clarence.

Rissa tridactyla pollicaris *Ridgw.* PACIFIC KITTIWAKE.

Common on the Pribyloffs.
Two specimens; Otter Island, June 12–14.

Rissa brevirostris (*Bruch*). RED-LEGGED KITTIWAKE.

Common on the Pribyloffs.
Six specimens; Otter Island, June 12–14.

Diomedea nigripes *Aud.* BLACK-FOOTED ALBATROSS.

I obtained several "gonies" in the North Pacific, two or three hundred miles south of the Aleutian Islands, by "fishing" for them over the stern of the vessel with a cod-line baited with pork. They followed in the wake of the steamer from the time we left California until the Aleutian Islands were sighted.

Three specimens (skeletons); May 15.

Fulmarus glacialis rodgersii (*Cass.*). RODGERS'S FULMAR.

Common on the Pribyloffs.

One specimen; Otter Island, June 14.

Phalacrocorax pelagicus (*Pall.*). VIOLET-GREEN CORMORANT.

One specimen; Ounalaska, October 23. Common.

Anas americana *Gmel.* BALDPATE.

Abundant at Port Clarence in August.

One specimen; Port Clarence, August 29.

Clangula hyemalis (*Linn.*). OLD SQUAW.

We found this species in abundance late in June at Port Clarence, where we shot many.

Histrionicus histrionicus (*Linn.*). HARLEQUIN DUCK.

Common at Otter Island, where I obtained one specimen June 14. A flock of twenty or more could be seen on the rocks near the landing at low tide almost any day.

Arctonetta fischeri (*Brandt*). SPECTACLED EIDER.

Captain Healy shot a fine specimen of this bird for me at Port Clarence on June 29.

Anser albifrons gambeli (*Hartl.*). AMERICAN WHITE-FRONTED GOOSE.

One specimen; St. Michael's, September 4.

Branta canadensis minima *Ridgw.* CACKLING GOOSE.

Two specimens; St. Michael's, September 4.

Philacte canagica *Serast.* EMPEROR GOOSE.

Common at St. Michael's. Three or four stragglers were seen also at St. Paul Island in September.

Three specimens; St. Michael's, September 4.

Grus canadensis (*Linn.*). LITTLE BROWN CRANE.

While at St. Paul Island some natives came to me and reported having seen a large long-legged bird wading in a shallow pond near the village, and gave me a large feather which the bird dropped in its flight. There is no doubt in my mind about this being a crane, as the species is abundant on the mainland, while herons are unknown there. Mr. Elliott tells me of having seen cranes on St. Matthew's Island. It is not given in his list of the birds of the Pribyloffs.

Crymophilus fulicarius (*Linn.*). RED PHALAROPE.

Phalaropes were constantly present upon a shallow salt-water pond on Otter Island during our stay there.

Eight specimens; Otter Island, June 8–12.

Macrorhamphus scolopaceus (*Say*). LONG-BILLED DAWITCHER.

One specimen; Port Clarence, August 30.

Tringa couesi *Ridgw.* ALEUTIAN SANDPIPER.

Five specimens; Ounalaska, October 23. Abundant, in flocks.

Tringa maculata *Vieill.* PECTORAL SANDPIPER.

Two specimens; Schismareff Inlet, August 28; Port Clarence, June 28.

Tringa damacensis (*Horsf.*). LONG-TOED STINT.

By the capture of this Asiatic bird on Otter Island, Alaska, where I shot an adult female, in breeding plumage, on June 8, 1885, a species is added to the fauna of North America. It was feeding in a shallow salt-water pond, with other *Tringæ*, which I supposed to be *Actodromas*. In his Ornithology of Kamtschatka Mr. Stejneger writes as follows of this species: "The Long-toed Stint arrives at Bering Island in large flocks during the latter part of May, and is then met with on sandy beaches, where the surf has thrown up large masses of sea-weed, busily engaged in picking up the numerous small crustaceans, &c., with which the weeds abound. Most of the birds stay only a few days, going further north, while a small number remain over summer, breeding sparingly on the large swamp behind the village. My efforts to find the nests were unsuccessful, but I shot birds near Zapornaja Reschka on the 17th and 22d of June and on the 7th of August."

Tringa alpina pacifica (*Coues*). RED-BACKED SANDPIPER.

Two specimens; Port Clarence, June 28; Hall's Island, September 8.

Limosa lapponica baueri (*Naum.*). PACIFIC GODWIT.

One specimen; Port Clarence, August 29.

Heteractitis incanus (*Gmel.*). WANDERING TATLER.

One specimen; Otter Island, June 8.

Charadrius dominicus fulvus (*Gmel.*). PACIFIC GOLDEN PLOVER.

Two specimens; Port Clarence, June 28–August 29. Abundant.

Arenaria interpres (*Linn.*). TURNSTONE.

One specimen; Port Clarence, June 28.

Lagopus rupestris nelsoni *Stejn.* NELSON'S PTARMIGAN.

I had excellent sport shooting these birds on Hog Island, at the entrance of Captain's Harbor.
Eleven specimens; Ounalaska, May 28.

Haliæetus leucocephalus (*Linn.*). BALD EAGLE.

Very common about the rocky bluffs of Ounalaska Island.

Corvus corax sinuatus (*Wagl.*). AMERICAN RAVEN.

Two specimens; Ounalaska, October 23.

Leucosticte griseonucha (*Brandt*). ALEUTIAN ROSY FINCH.

Common on the Pribyloff and Aleutian Islands.
Twelve specimens; Ounalaska, October 23; Otter Island, June 8.

Acanthis hornemannii exilipes (*Coues*). HOARY REDPOLL.

One specimen; Port Clarence, June 28. Common.

Plectrophenax nivalis (*Linn.*). SNOWFLAKE.

Pribyloffs. Common.
Five specimens; Otter Island, June 8.

Plectrophenax hyperboreus *Ridgw.* MCKAY'S SNOWFLAKE.

While the *Corwin* was anchored off Hall's Island, on September 8, I obtained two specimens of this species, which was comparatively numerous there, flying in pairs over the sphagnum-covered hill-slopes or gathering in small numbers in the ravines near the sea-shore. The breeding-place of this species, which was described in 1884 from specimens taken at Nushagak, Alaska, by Mr. Charles McKay, and at St. Michael's, by Mr. Nelson, has remained a mystery

until its discovery in young and breeding plumage on Hall's Island. It is not improbable that the snowflakes of this island and the large adjoining island of St. Matthew's are all *hyperboreus*, snowflakes having been seen on the latter in abundance by Mr. Elliott. Mr. Ridgway suggests (The Auk, April, 1886) that the snowflakes of St. Lawrence Island, more than a hundred miles to the northward, may be of this species, but that all those as yet known from the Pribyloffs, two hundred miles to the southward, are true *P. nivalis*. Less than a dozen specimens of *P. hyperboreus* have ever been taken. The plate representing this bird was drawn from the type specimens in spring plumage. In summer plumage it may readily be distinguished from the ordinary snowflake by its general whiteness, having no black except on the tips of the quills, while *nivalis* is conspicuous by its black back and more extensively blackened primaries. *P. nivalis* has also the three middle pairs of tail-feathers black to the base, *hyperboreus* having them but slightly black near the ends. The females of *hyperboreus* are paler and less marked with black than those of *nivalis*.

Calcarius lapponicus (*Linn.*). LAPLAND LONGSPUR.

These birds, which were plentiful in June, were rare in August.

Two specimens; Port Clarence, June 28.

Ammodramus sandwichensis (*Gmel.*). SANDWICH SPARROW.

One specimen; Ounalaska, October 16. The only one seen.

Melospiza cinerea (*Gmel.*). ALEUTIAN SONG SPARROW.

Very abundant about Ounalashka Island. I saw several Aleutian song sparrows caged, and in every instance they were confiding and familiar when taken from the cage and given the liberty of the house. The song in confinement is a low whistle, sweet and plaintive.

Twelve specimens; Ounalaska, October 19–21.

Passerella iliaca (*Merr.*). FOX SPARROW.

I saw several fox sparrows in brushy places near the hills at Port Clarence, but they were wild and kept in the cover so closely that it was quite impossible to shoot them.

Cinclus mexicanus *Swains.* AMERICAN DIPPER.

The only dipper I saw in Alaska was one I shot on the border of the lake behind the village at Ounalaska, October 16.

Troglodytes alascensis *Baird.* ALASKAN WREN.

Five specimens; Ounalaska, October 19. Abundant.

Phyllopseustes borealis (*Blas.*). KENNICOTT'S WILLOW WARBLER.

I shot my second specimen of this *rara avis* at Port Clarence on August 30, but lost it while returning to the ship. The other specimen was taken on the Kowak River August 1. The species is a straggler from the Asiatic side of the Straits.

Turdus alicise *Baird.* GRAY-CHEEKED THRUSH.

This bird was seen on three or four occasions at Port Clarence and Schismareff Inlet late in August.

One specimen; Port Clarence, August 30.

FISHES.

Ammodytes americanus personatus *Girard.* SAND LANCE.

One specimen; Port Clarence, August 31. The only one seen.

Cottus humilis *Bean.*

A single specimen of this species was brought aboard the *Corwin* at Cape Prince of Wales June 30.

Gymnacanthus galeatus *Bean.*

One specimen; Port Clarence, August 31. The only one seen.

Hemilepidotus jordani *Bean.*

Two or three specimens of this fish were identified at Ounalaska, but none were saved.

Podothecus acipenserinus *Tilesius.*

I obtained this fish at St. Paul Island, and saw a few dried specimens at Ounalaska of what appeared to be the same species. Such fishes are common there.

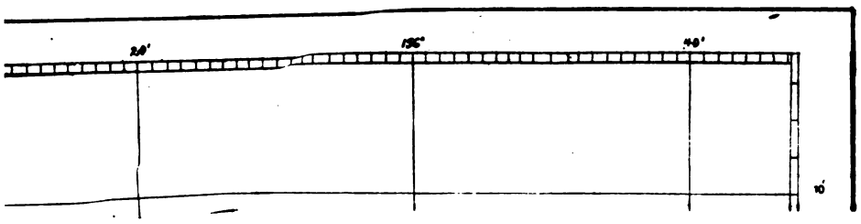
One specimen; St. Paul Island, June 6.

Pleurogadus navaga *Kölr.*

One specimen; Golwin Bay, September 1. Common.

Hippoglossoides jordani *Lockington.*

Numerous at Ounalaska. I was unable to make a collection of fishes at Onalaska, as my alcohol tank was in the hold of the steamer, where it could not be reached.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